"A prospective evaluation of the role of oncoplastic incisions for benign breast lump excision"

Thesis submitted to the faculty of

ALL INDIA INSTITUTE OF MEDICAL SCIENCES,

BHOPAL

For the award of the degree of MS in

General Surgery

By

Dr. Suprateek Saha

2100364M02P29014

Under the guidance of

Dr Swagata Brahmachari

Additional Professor

Department of General Surgery

AIIMS, Bhopal.

October 2023

ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL

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Dr. Suprateek Saha

Academic Junior Resident
Department of General Surgery
AIIMS, Bhopal

Guide:

Dr. Swagata Brahmachari
Additional Professor
Department of General Surgery
AIIMS, Bhopal

Dr. SWAGATA BRAHMACHARI
MS, FACS
Reg. No. 11679
Additional Professor
Department of General Surgery
AIIMS, Saket Nagar

Place: Bhopal
Date: 14/10/23

ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL

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Guide:

Dr. Swagata Brahmachari
Additional Professor
Department of General Surgery
AIIMS, Bhopal

Co-Guide:

Dr. Ajeet Pratap Maurya
Associate Professor
Department of General Surgery
AIIMS, Bhopal

Co-Guide:

13/10/23

Dr Radha Gupta
Additional Professor
Department of Radiology
AIIMS Bhopal

डॉ. राधा सारावगी गुप्ता/Dr. Radha Sarawagi Gupta
एम.डी./M.D.
अतिरिक्त प्राध्यापक/Additional Professor
रेडियोडायग्नोसिस एवं इमेजिंग विभाग
Department of Radiodiagnosis & Imaging
अखिल भारतीय आयुर्विज्ञान संस्थान, भोपाल
All India Institute of Medical Sciences, Bhopal

Co-Guide:

Dr. Ved Prakash
Associate professor
Department of Burns and Plastic Surgery
AIIMS Bhopal

डॉ.वेद प्रकाश राव चेरूवु/Dr. Ved Prakash Rao Cheruvu
M.S.,M.Ch.(Plastic Surgery) FCAPS/Reg.No.61022
सह-प्राध्यापक/Associate Professor
बर्न एण्ड प्लास्टिक सर्जरी विभाग/Deptt. of Burns & Plastic Surgery
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
All India Institute of Medical Sciences Bhopal-462020

Place: Bhopal

Date: 14/10/23

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Dr. Suprateek Saha

Academic Junior Resident
Department of General Surgery
AIIMS, Bhopal

Place: Bhopal

Date: 14/10/23

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CERTIFICATE

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Dr. Rajesh Malik
Dean (Academics)
AIIMS, Bhopal

Place: Bhopal

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Dr. Pradeep Saxena
Professor and Head
Department of General Surgery
AIIMS, Bhopal

HOD
Department of General Surgery
AIIMS, Bhopal-462020 (M.P.)

Place: Bhopal

Date: 14/10/23

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Dr. Suprateek Saha

Academic Junior Resident
Department of General Surgery
AIIMS, Bhopal

Guide:

Dr. Swagata Brahmachari
Additional Professor
Department of General Surgery
AIIMS, Bhopal

Co-Guide:

Dr. Ajeet Pratap Maurya
Associate Professor
Department of General Surgery
AIIMS, Bhopal

Dr. AJEET P. MAURYA
MS, (GEN. SURGERY)
Associate Professor
Department of General Surgery
AIIMS, Bhopal (M.P.)-462020

Co-Guide:

Dr Radha Gupta
Additional Professor
Department of Radiology
AIIMS Bhopal

डॉ. राधा सारावगी गुप्ता/Dr. Radha Sarawagi Gupta
एम.डी./MD
अतिरिक्त प्राध्यापक/Additional Professor
रेडियोडायग्नोसिस एवं इमेजिंग विभाग
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Associate professor
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AIIMS Bhopal

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सह-प्राध्यापक/Associate Professor
बर्न एण्ड प्लास्टिक सर्जरी विभाग/Deptt. of Burns & Plastic Surgery
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
All India Institute of Medical Sciences Bhopal-462020

Place: Bhopal

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www.aiimsbhopal.edu.in E-mail: ihecpgr@aiimsbhopal.edu.in

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Dr. Suprateek Saha General Surgery	Dr. Swagata Brahmachari General Surgery

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Dr. Shashank Purwar
Member Secretary, AIIMS Bhopal IHEC-PGR
Additional Professor of Microbiology
AIIMS, Bhopal
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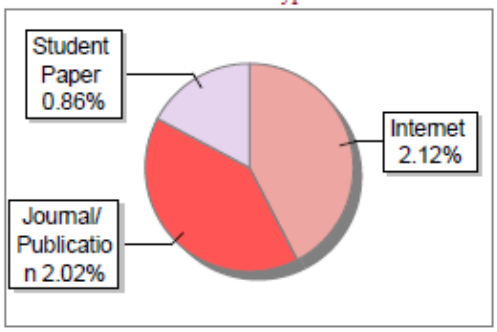

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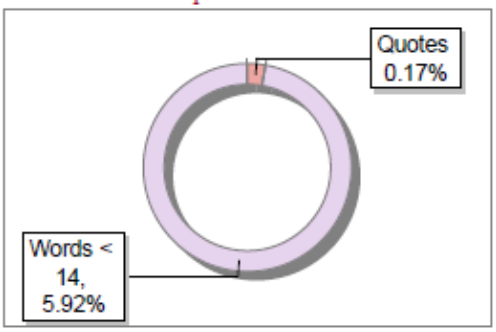

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- Dr Suprateek Saha

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APPENDIX III: LIST OF ABBREVIATIONS

NAC	NIPPLE AREOLA COMPLEX
ADH	ATYPICAL DUCTAL HYPERPLASIA
ALH	ATYPICAL LOBULAR HYPERPLASIA
OCP	ORAL CONTRACEPTIVE PILLS
USG	ULTRASONOGRAPHY
BIRADS	BREAST IMAGING REPORTING AND DATA SYSTEM
FNAC	FINE NEEDLE ASPIRATION CYTOLOGY
BCS	BREAST CONSERVATIVE SURGERY
BCT	BREAST CONSERVATION THERAPY
CRF	CORTICOTROPIN RELEASING FACTOR
DM	DIABETES MELLITUS
DCIS	DUCTAL CARCINOMA IN SITU
HTN	HYPERTENSION
Hb	HEMOGLOBIN

LCIS	LOBULAR CARCINOMA IN SITU
LOQ	LOWER OUTER QUADRANT
LIQ	LOWER INNER QUADRANT
UIQ	UPPER INNER QUADRANT
UOQ	UPPER OUTER QUADRANT
SD	STANDARD DEVIATION
SSI	SURGICAL SITE INFECTION
BMI	BODY MASS INDEX
FSH	FOLLICLE STIMULATING HORMONE
LH	LEUTINIZING HORMONE
GnRH	GONADOTROPIN RELEASING HORMONE
VAS	VISUAL ANALOGUE SCALE

Department of General Surgery, All India Institute of Medical Sciences, Bhopal – 462020.

A prospective evaluation of the role of oncoplastic incisions for benign breast lump excision

Candidate;
Dr. Suprateek Saha
MS Resident (July 2021)
Department of General Surgery
AIIMS, Bhopal

Guide:

Dr. Swagata Brahmachari, Additional Professor,

Department of General Surgery

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Candidate;
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Guide:

Dr. Swagata Brahmachari, Additional Professor,

Department of General Surgery

Co-Guide:

Dr. Ajeet Pratap Maurya, Associate Professor,

Department of General Surgery

Co- Guide:

Dr Radha Gupta, Additional Professor

Department of Radiology

Co- Guide:

Dr. Ved Prakash, Associate professor

Department of Burns and Plastic Surgery

INTRODUCTION

Benign breast disease carry significant burden due to its high prevalence, mostly affecting adolescents and young women of reproductive age group but is often overlooked (1). Surgical excision is the definitive procedure performed for palpable benign breast tumors. Historically breast lumps were removed surgically using an overlying incision, which got replaced by the new incisions, owing to the better cosmetic results proved by studies (2). The ideal end-result of any breast surgery is a good quality scar which is well placed and able to be camouflaged. Considering the benign pathology, incision planning and method of dissection is challenging, as successful excision must accompany cosmesis and preservation of breast structure and function.

The choice for incisions for excision of breast lumps depends upon the nature of tumour, and tumour: breast ratio. For breast cancer surgery the placement of the incision will be dictated to a degree by the malignancy. In contrast, in the removal of benign breast lumps, incision placement should take into account the cosmetic result. Choosing the best incision for a given patient depends upon the tumor features (fibroadenomas, phylloides tumor, galactocoele, gynaecomastia etc), site of lump and breast size. It is almost always possible to avoid making an unfavourably placed incision while excising a benign breast lump, if careful consideration is given preoperatively to the options. Almost all benign lumps can potentially be removed via either a circumareolar or inframammary incision. In larger breast lumps and those situated in inner quadrant and away from nipple areolar complex ,these incisions may jeopardize the perfusion of glandular or dermo-glandular tissue flaps due to excess removal of breast tissue or excessive dissection.(3) Here the oncoplasty incisions and procedures are helpful.

Oncoplastic surgical procedures may be used for a wide range of breast lumps to achieve resection with acceptable and improved breast appearance. Depending upon the size and location of the tumor, incisions used for oncoplastic surgeries such as crescentic incision, batwing incision and round block etc are now favored for relatively scarless breast surgery.

Modern surgery is patient centered and has many technical possibilities to maintain the aesthetic and function during excision so that quality of life is not affected.

The aim of this clinical study is to analyze the aesthetic results and patients' reported quality of life and satisfaction in benign breast lesions patients undergoing conventional or oncoplastic excision.

According to the study's hypothesis, benign breast lesion excision can be safe with low complication rates resulting in good cosmesis, high rate of patient satisfaction and good quality of life, with the application of modern oncoplastic breast incisions. We propose that in this study, oncoplastic incisions will be able to offer better cosmetic results (no distortion of Nipple Areola Complex (NAC) and pathological scar will not develop) than conventional surgeries. We also will be able to determine the applicability and safety of oncoplastic surgical techniques, highlighting the specific circumstances when it will be most useful and compare our preferred technique with the conventional lumpectomy in benign breast lesions.

The crescent incision approach provides a wide surgical exposure, allows excision of benign giant breast tumor, and simultaneous restoration of the breast shape with favorable aesthetic results and minimal postoperative scarring in single stage operation.

REVIEW OF LITERATURE

The breast is a modified sweat gland which is a highly evolved structure that is found in pairs on the anterior chest wall of both males and females. In contrast to males, where they are rudimentary, the breast's major role in females is to secrete milk, making it an important supplementary reproductive organ (17).

The Milk ridge/Milk line is where the mammary gland develops embryologically, and it comprises of 15-20 secondary buds that grow into the primary tissue bud, which then forms epithelial cords and extends into the mesenchyme around it. The fourth to sixth week of intrauterine life is when the embryological development takes place. Lactiferous ducts form and eventually open into a mammary pit. By the time of birth, mesenchymal growth has changed the mammary pit into a nipple. Breast development doesn't start until puberty, when it increases due to the proliferation of connective and epithelial tissue in response to ovarian estrogen. Complete breast growth happens during pregnancy and lactation. The areola darkens, accessory areolar glands proliferate, and there is ductal and lobular proliferation during pregnancy (17–19).

Surgical anatomy:

The female breast is located on the anterior thoracic wall and spans the second to sixth ribs. It extends inferiorly from the inframammary fold to the second or third rib superiorly. It runs transversely from the mid-axillary line laterally to the lateral sternal lateral boundary. The serratus anterior muscle, upper abdominal oblique muscle, and upper end of the Rectus Sheath all make contact with one-third of the breast; the remaining two-thirds rest on the Pectoralis Major muscle. The Axillary tail of Spence,

a portion of breast tissue that extends into the axilla, is referred to as such (20). A well-developed axillary tail can occasionally be mistaken for an enlarged lymph node or lipoma, making the Axillary tail of Spence of crucial surgical value.

The breast has a projecting conical shape, a roughly circular base (10–12 cm in diameter), and its top outer quadrant has the most capacity. Individuals differ in size, shape, contour, and density.

Skin, parenchyma, and stroma are the three components that make up the female breast's structure.

The NAC, or nipple-areola complex, is part of the skin.

A) Nipple: Located in the fourth intercostal gap, this conical protuberance is covered in thick, corrugated skin that lacks sweat glands, fat, or hair. The opening that is located at its apex is where the lactiferous ducts (15–20 in number) open.

B) Areola: During pregnancy and breastfeeding, this pigmented region around the nipple, which also has modified sebaceous glands, is referred to as tubercles of Montgomery. By secreting oily secretions, the main purpose is to prevent cracking of the nipple and areola (17). The sub areolar Plexus of Sappy, which drains into the axillary lymph node, was discovered by Sappey in the 1870s, demonstrating that the lymphatics of the torso differ from those of the breast (21).

Parenchyma - breast has between 15 and 20 lobes, with numerous lobules on each lobe. A lactiferous duct that drains each lobe condenses radially at the tip of the nipple and opens into an aperture there. Before each duct's end, each has a dilatation

known as a lactiferous sinus, where milk is gathered and released upon the baby's sucking.

The breast's structural support system, or stroma, surrounds the parenchyma.

A) Fibrous stroma: These are the cooper's suspensory ligaments; hollow fibrous cones within of which the breast tissue is located, dividing each lobe and suspending the entire breast tissue from the pectoral fascia. These ligaments can become distorted in cases of breast cancer, which can cause the skin above it to become hard and pucker (17).

B) Fatty stroma, which constitutes the majority of the mammary gland. Yet the nipple and areola are devoid of it (17).

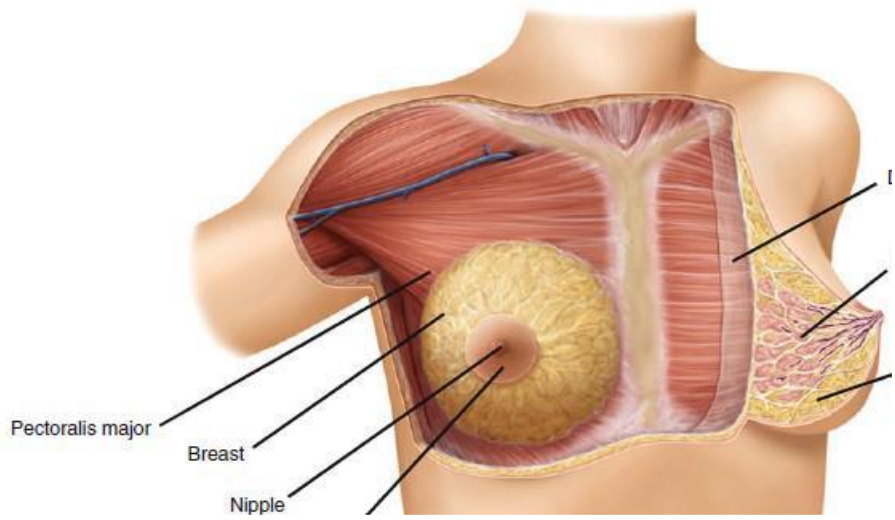


Figure 1 shows the breast and related chest wall in anterior and cross-sectional (sagittal) perspectives (22).

Blood supply and lymphatics:

Arterial supply:

The breast receives its main arterial supply from the following five arteries.

1) Perforating branches of the internal mammary artery.

2) Lateral branches of the posterior intercostal arteries.

3) Branches from the axillary artery – highest/superior thoracic artery, lateral thoracic, pectoral branches of the thoraco-acromial artery. 2nd, 3rd, 4th anterior intercostal perforators and branches of the internal mammary artery arborize in the breast as the medial mammary arteries.

Venous supply:

Veins follow a similar course and drain towards the axilla vein, internal thoracic, and second to fourth intercostal veins.

- Medial breast – Internal thoracic vein
- Lateral breast – tributaries of the axillary and intercostal vein
- The intercostal veins drain to the vertebral vein, azygous and hemizygous system (22). Deep veins from the breast drain into Bateson's vertebral venous plexus which extends from the base of the skull to sacrum and invests the vertebrae, may act as a route for cancer metastases to the vertebrae, skull, pelvic bones and central nervous system (17).

  Metastases of cancer from the breast to the lungs occur by two pathways:

1) Internal thoracic vein draining to the brachiocephalic vein

2) Axillary vein into the subclavian vein

Both brachiocephalic and subclavian vein drains into the right heart.

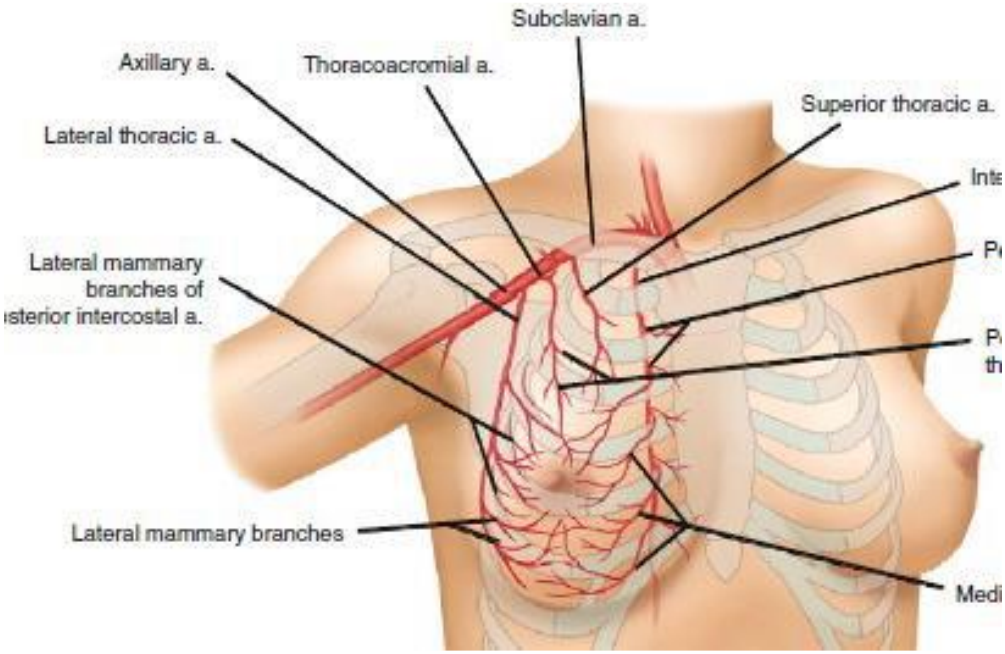


Figure 2. Arterial supply of the breast (22)

Lymphatic drainage of breast:

There are two main groups of the lymph node that are responsible for the lymphatic drainage of breast tissue.

1) Axillary nodes –they are seen in the axillary pad of fat and further divided into five groups.

A) Anterior pectoral/external mammary group: lies along the lateral thoracic vessels on the lower border of pectoralis minor and drains the outer quadrant of the breast.

B) Posterior (subscapular) group: lies along the lower border of the subscapularis and drains the lower outer quadrant of the breast.

C) Lateral group (Axillary vein nodes): seen beside the humerus along the lateral wall of the axilla.

D) Central group: anterior, posterior and lateral groups of LN drains into the central group. Seen in the base of the axilla.

E) Apical group: All the other four groups of LN drains into this and also the lymph directly from the medial quadrant. Seen deep in the axillary apex (17).

F) Interpectoral (Rotter's) nodes

G) Sub-clavicular nodes

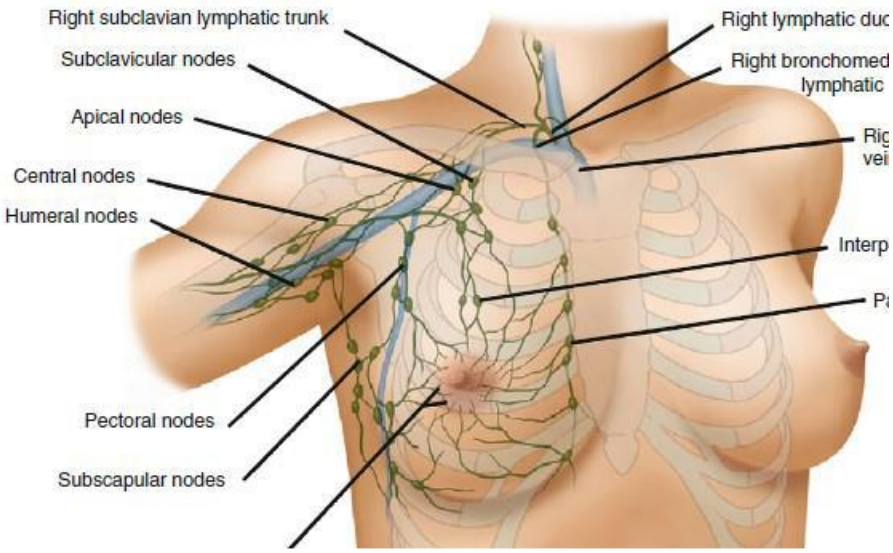


Fig.3 Lymphatic drainage of the breast (22).

The levels of axillary nodes may be defined according to their relation with pectoralis minor muscle.

- Level I – nodes lateral to the lower border of pectoralis minor
- Level II- nodes located between the medial and lateral borders of pectoralis minor muscle, and the interpectoral nodes
- Level III- nodes found medial to the medial border of pectoralis minor muscle

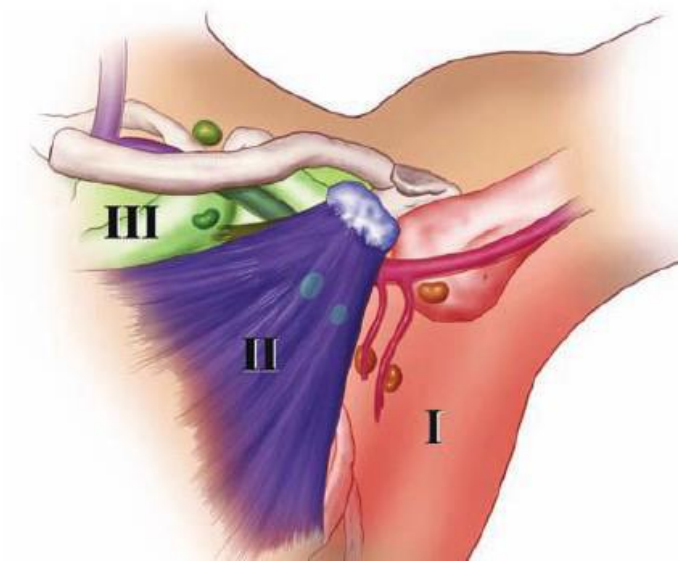


Fig.4 Axillary lymph node groups (19).

2) Parasternal/ internal mammary nodes: seen on the lateral border of sternum along the internal mammary artery draining the medial quadrant of the breast. These groups have communication with the parasternal nodes on the opposite side and this act as a route for cancer metastases from one side to the other (17).

Other Lymph nodes:

1) Supraclavicular

2) Cephalic/deltopectoral

3) Posterior intercostal

4) Subdiaphragmatic and subperitoneal plexuses – route for abdominal spread.

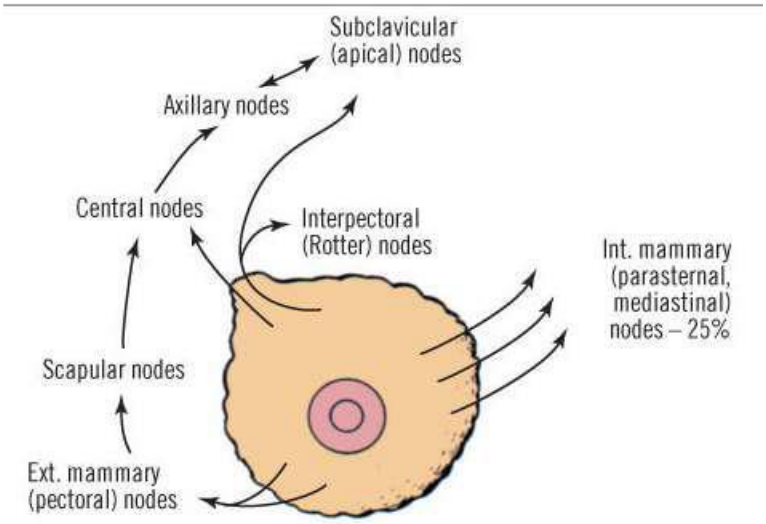


Fig. 5 Lymphatic drainage of breast route for abdominal spread. (Skandalakis' Surgical Anatomy, TheMcgraw- Hill Companies, Inc 2006)

Axillary group of lymph nodes drain about 75% to 80% of lymphatic drainage. The anterior group is the major draining node among these.Internal mammary group –20% to 25% of lymphatic drainage from the breast.

Surgeons should have thorough knowledge about the lymphatic system of breast especially during radical mastectomy of malignant tumors since lymphatics is a common route cancer malignancy in the breast (17).

Nerve supply:

Anterior and lateral cutaneous branches from the 2nd to 6th intercostal nerves provide sensory and sympathetic innervation of breast and the anterolateral chest wall. A small area of skin over the upper part of the breast is supplied by the anterior branches of the supraclavicular nerve. The lateral cutaneous branch of 2nd intercostal nerve – intercostobrachial nerve can be seen during axillary dissection and its resection can lead to loss of sensation over the medial aspect of the upper arm (19).

Nerve supply of NAC- The nipple-areola complex is consistently supplied by the anterior and lateral cutaneous branches of the IVth intercostal nerve, with additional innervation by cutaneous branches of the IIIrd and Vth intercostal nerves. (29)

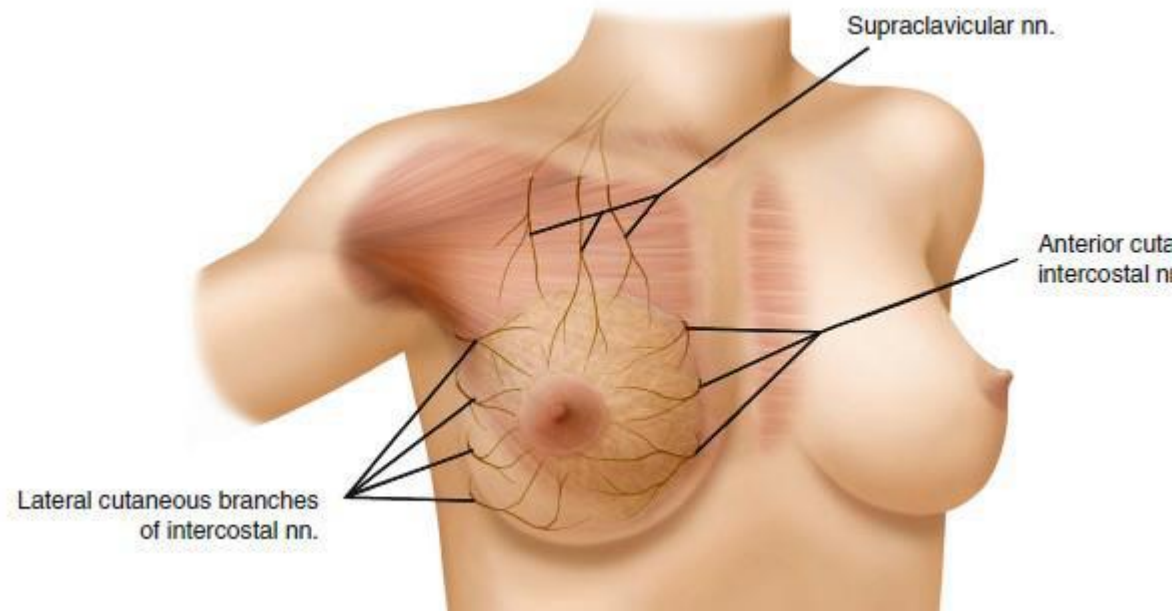


Figure: 6 Sensory innervation of Breast (22).

BENIGN DISORDERS AND DISEASES OF THE BREAST:

Under a single language, benign breast illnesses and diseases include a broad spectrum of clinical and pathologic phenomena. A surgeon must be knowledgeable about benign breast problems and diseases in order to give affected women precise information, the proper care, and to prevent needless long-term follow-up. (4)

ABERRATIONS OF NORMAL DEVELOPMENT AND INVOLUTION:

The following ideas guide the classification of benign breast diseases as aberrations of normal development and involution (ANDI):

There is a spectrum of breast conditions that ranges from normal to disorder to disease. The ANDI classification takes into account all aspects of the breast condition, including pathogenesis and the degree of abnormality (26). Benign breast disorders and diseases are related to the normal processes of reproductive life and to involution.

Table no 1-ANDI at different phases of life

PERIOD OF LIFE	NORMAL	DISORDER	DISEASE
Early reproductive years (age 15 - 25 years)	• Lobular development • Stromal development • Nipple eversion	• Fibroadenoma • Adolescent hypertrophy • Nipple inversion	• Giant fibroadenoma • Gigantomastia • Subareolar abcess • Mammary duct fistula

Later reproductive years (age 25 – 40 years)	• Cyclical changes of menstruation • Epithelial hyperplasia of pregnancy	• Cyclical mastalgia • Nodularity • Bloody nipple discharge	• Incapacitating mastalgia
Involution (age 35 – 55 years) (postmenopausal)	• Lobular involution • Duct involution • Dialation • Sclerosis • Epithelial turnover	• Macrocysts • Sclerosing lesions • Duct ectasia • Nipple retraction • Epithelial hyperplasia o Ductal o Lobular	• Periductal mastitis • Epithelial hyperplasia with atypia o Ductal o Lobular

Early Reproductive Years- Fibroadenomas present symptomatically predominantly in younger women age 15 to 25 years. (27) Fibroadenomas can grow to 1 or 2 cm in diameter and then are stable but may grow to a larger size. Fibroadenomas of ≤1 cm in size are considered normal, whereas larger fibroadenomas of 1 to ≤3 cm are disorders, and giant fibroadenomas (>3 cm) are disease. Multiple fibroadenomas (more than five lesions in one breast) are very rare and are considered to be pathological. Etiology of adolescent breast hypertrophy is unknown. A spectrum of changes from limited to massive stromal hyperplasia often termed as gigantomastia is seen. Nipple inversion is considered as a disorder of development of the major ducts, preventing normal protrusion of the nipple. Mammary duct fistulas occur when nipple inversion

predisposes to major duct obstruction, causing recurrent subareolar abscess and mammary duct fistula. (4)

Later Reproductive Years. Cyclical mastalgia and nodularity usually are associated with premenstrual enlargement of the breast and are considered as normal. Cyclical pronounced Review of Literature mastalgia and severe painful nodularity are regarded differently than are physiologic discomfort and lumpiness. Painful nodularity persisting for more than 1 week of the menstrual cycle is considered a disorder. Epithelial hyperplasia of pregnancy, papillary projections sometimes give rise to bilateral bloody nipple discharge. (4)

Involution- The specialized stroma surrounding the lobular epithelium is a necessary component of the process of involution. There are various common illnesses caused by the fact that an integrated involution of the breast stroma and epithelium is not always the case. Rapid involution leads to the production of microcysts, which are macrocyst precursors. The macrocysts are typical, frequently asymptomatic, and don't need any special care. A disease of both the proliferative and involutional phases of the breast cycle is sclerosing adenosis. Other elements of the ANDI categorization include periductal mastitis and duct ectasia (dilated ducts). Nipple retraction can occur as a result of periductal fibrosis, a side effect of periductal mastitis. Women who are over 70 years old who have some degree of epithelial hyperplasia are about 60% of the population. Ductal and lobular hyperplasia are atypical proliferative disorders that share characteristics with cancer in situ. (4)

PATHOLOGY:

The most important aspect of management of benign breast disorders and diseases is histologic differentiation into benign, atypical and malignant (28,29). The classification system developed by *Page* separates various types of benign breast disorder and diseases on the basis of the following parameters:

i) Cellular proliferation status and

ii) Atypical cellular morphology

Based on above characteristics benign breast diseases were classified by Page as following:

• Non-proliferative disorders of breast:

i) Cyst and apocrine metaplasia

ii) Duct ectasia

iii) Mild ductal epithelial hyperplasia

iv) Calcifications

v) Fibroadenoma and related lesions

• Proliferative diseases without atypia:

i) Sclerosing adenosis

ii) Radial and complex sclerosing lesions

iii) Ductal epithelial hyperplasia

iv) Intraductal papilloma

• Atypical proliferative lesions:

i) Atypical lobular hyperplasia

ii) Atypical ductal hyperplasia

- Benign breast lumps in males- Majority of breast lumps in males are due to Gynaecomastia and benign breast cysts. (30)

BENIGN BREAST DISEASES- Majority of the breast lumps which are clinically detected in women of reproductive age group are benign. This amounts to about 94% to 97% of all the breast lumps. Fibrocystic changes accounts to about 50 % of all benign breast disorders in women aged 30 years or more. They typically present with symptoms like pain, a palpable mass, and nipple discharge. The common palpable benign breast lumps are as follows.

-Breast cysts

-Fibroadenoma

-Lipoma

-Hamartoma

-Phylloides tumor

-Gynaecomastia

FIBROADENOMA

Epidemiology- Fibroadenomas are benign solid tumors composed of stromal and epithelial elements. Fibroadenoma is the second most common tumor in the breast (after carcinoma) and is the most common (incidence being 25%) benign tumor in women with peak between 15 to 35 years of age. Fibroadenomas are rarely seen as new masses in women after age 40 or 45 years. (3). The incidence of fibroadenoma decreases with increasing age and generally found before 30 years of age in females in the general population. It is estimated that 10% of the world's female population suffers from fibroadenoma once in a lifetime. (3)

ETIOPATHOGENESIS - Exact etiology and pathogenesis of fibroadenoma is still obscure. Recently it has been categorized under ANDI as hyperplasia of a single lobule

of the breast. It is likely to be secondary to hormonally triggered mechanism leading to aberration in normal development (AND) of a lobule. It shows similar hormonal activities of normal breast like lactation, perimenopausal involution. This partly explains the risk factors that lead to higher levels of hormonal exposure being associated with development of fibroadenoma; early menarche, nulliparity, non-lactation etc. and the protective factors being late menarche, multiparity, lactation, use of oral contraceptive pills. (3)

PATHOLOGY-

Grossly, fibroadenoma are firm well circumscribed, ovoid to irregular shaped lumps with bosselated surface, often grey colored and on cut section lobulations tend to bulge above cut surface contain slit like spaces and can have a mucoid or fibrotic appearance with or without calcifications. (3,32,33)

GLANDULAR COMPONENT-

There are two recognized growth patterns seen (these aren't clinically significant and single lesion can have both types of patterns);

Intracanalicular- Glands are compressed into linear branching structures by proliferating stromal components.

Pericanalicular- Glands retain open lumen but are separated by expanded stroma, glandular elements contain myoepithelial cell layers in intact form. (3,32). Often there is associated usual ductal hyperplasia, apocrine metaplasia, cyst formation or squamous metaplasia. Mitotic activity can be seen rarely in the glandular component which carries no clinical significance (3,32,33).

STROMAL COMPONENT-

In a given lesion usually show uniform cellularity, contain collagen and bland spindle shaped stromal cells with ovoid or elongated nuclei, usually devoid of any mitotic activity but in rare instances these can be present, doesn't contain any stromal atypia, stroma can show myxoid change or hyalinization, multinucleated giant cells, rare findings can be present in the form of benign heterologous elements (adipose, smooth muscle, osteochondroid metaplasia) (3,32,33).

PATHOLOGY-

Clinically Diagnosed fibroadenomas are confirmed mostly by FNAC as a mode of tissue diagnosis and following are the typical features in a FNA sample, (32)

1. Cellular specimen

2. Abundant sheets and clumps of epithelial cells in a background of scanty stromal fragments and bare/stripped nuclei

3. Epithelial cells may show some variation in size and some dis-cohesion

PATHOLOGICAL VARIANTS-

A) Myxoid fibroadenoma- Prominent myxoid stromal change which is composed of abundant pale, blue-gray extracellular matrix.

B) Complex fibroadenoma- Cysts >3mm, sclerosing adenosis, epithelial microcalcifications or papillary apocrine metaplasia.

C) Cellular fibroadenoma- Diffuse stromal hypercellularity

D) Juvenile fibroadenoma- High stromal cellularity, epithelial hyperplasia with gynecomastoid like papillary projections, fascicular stromal arrangement, pericanalicular growth pattern, can be associated with rapid growth and large size (3,32,33).

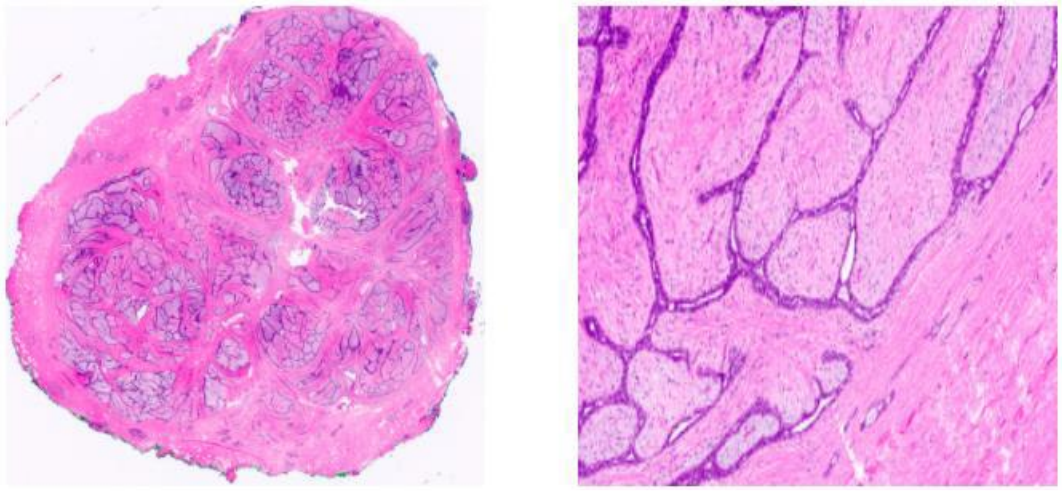


Fig: Microscopic morphology of Fibroadenoma (3)

CLINICAL PRESENTATION-

- Often presents as painless, firm, mobile, slow growing mass
- Usually solitary, can be multiple and bilateral
- Usually less than 3 cm in diameter but may grow to large size (Giant fibroadenoma, > 5cm in diameter, seen in African countries commonly) (3,4,32-34)

MANAGEMENT OF FIBROADENOMAS-

The management of fibroadenoma depends on the age of diagnosis. Fibroadenomas diagnosed before 35 years of age and size < 3cm, conservative management with 6 monthly follow up is recommended (38). Fibroadenomas that either do not completely regress, or remain unchanged by the age of 35, increasing in size, or pathologically proven proliferative lesion, and size >/= 3cm should be excised surgically.

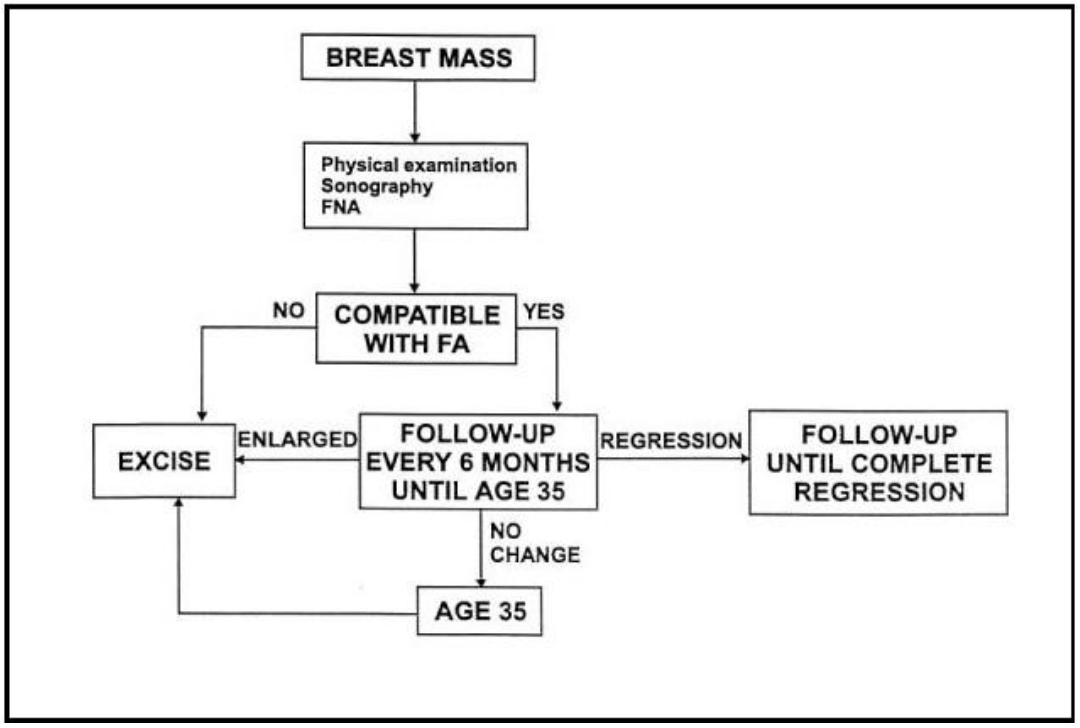


Fig.1: Management of fibroadenoma diagnosed in women <35 years: FA: fibroadenoma (38)

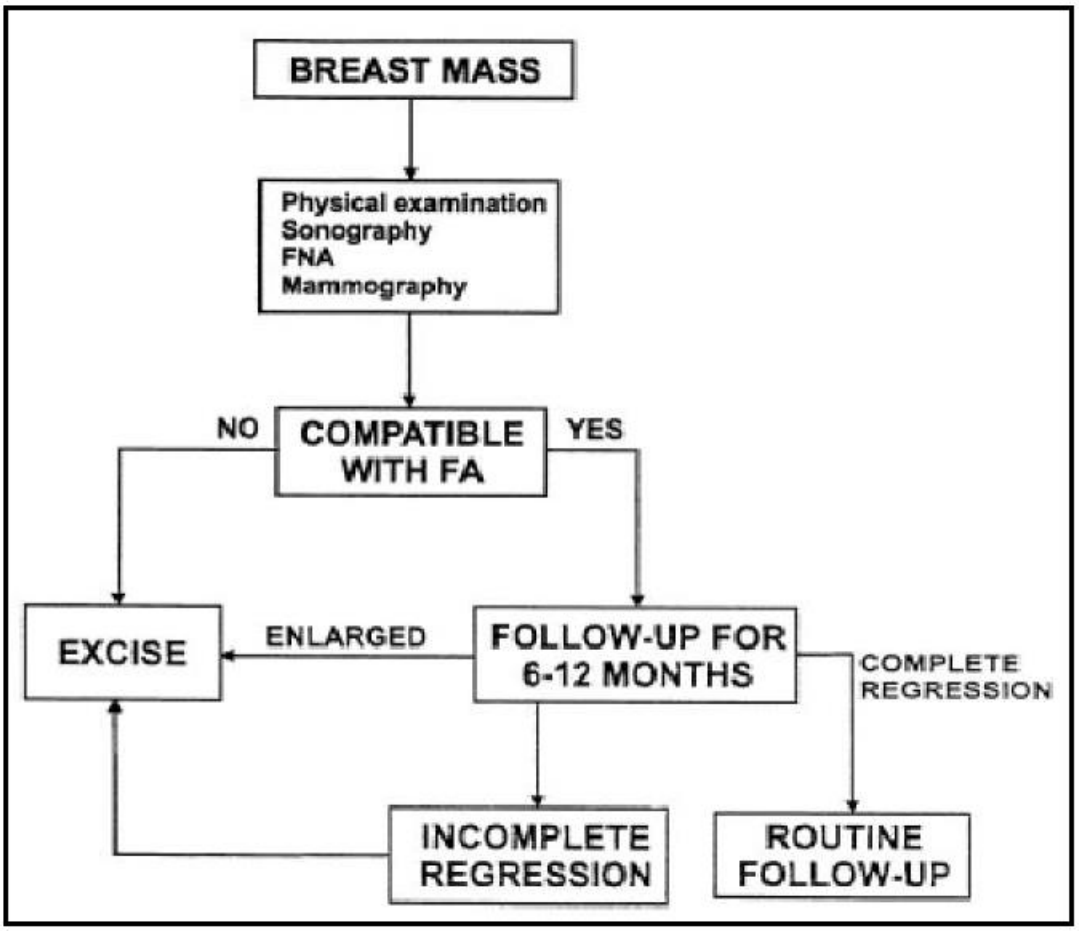


Fig2: Management of fibroadenoma in women >35 years of age. FA: fibroadenoma (38)

PHYLLODES TUMOR-

They are rare breast neoplasms which accounts for 0.3 to 1 % of breast tumors. These tumors are benign in majority of cases and 2.5 % of all fibroepithelial tumors, however they can be malignant also. They are predominantly seen in middle aged women (peak between 40 and 50 years). Phyllodes tumor is classified into benign, borderline and malignant as per histopathological features.

Local or wide excision is deemed to be the preferred method when treating benign phyllodes tumors. To prevent local recurrence in malignant tumors wide excision with

1-2 cm tumor free margins are usually performed. Local recurrences are quite common for both benign and malignant phyllodes. (39)

GYNAECOMASTIA-

Gynaecomastia refers to increase in male breast volume, due to an increase in ductal tissue, stroma, or fat. The condition most often occurs during times of hormonal change such as birth, adolescence and old age. Many conditions are known to cause this condition like extreme obesity, pharmacological agents, steroid use, medical conditions including hypogonadism, liver, and kidney failure. However, the majority of patients present with idiopathic gynecomastia. The treatment of this condition consists of treating the underlying condition, lab work, imaging, and surgical intervention, when necessary. Surgical intervention may be excision of breast tissue or subcutaneous mastectomy.

Patients with grade I or grade IIa can be treated with liposuction and surgical excision.

If the patient presents with grade IIb gynecomastia, open surgical excision with possible skin resection is indicated if a large amount of ptosis is present.

LUMPECTOMY-

The most common surgery performed for benign breast lump is lumpectomy or wide local excision.

Breast lumps were initially excised with an overlying incision, with incision being given directly over the lump so as to excise the lump but it could not provide any

cosmetic advantage. Hence it was soon replaced with newer periareolar incision. (31)

Hollander first introduced the periareolar incision in 1924. It is a versatile technique, initially introduced as a mastopexy technique, has expanded its applications and can now be used for multiple surgical situations. Study conducted by Marco klinger et al. concluded that periareolar incisions can achieve excellent results. (26)

In studies conducted by Xiangnan Kong et al., the authors concluded that periareolar incision brings hope to female patients with benign breast tumor; it enables the disease to be cured while maintaining the appearance of the breast. (27)

Benign breast lesions such as fibroadenomas were conventionally removed by periareolar and lateral inframammary incisions. X.-F. Liu et al (2011), conducted a retrospective study on fibroadenoma excision through overlying and periareolar incision. The results were such that early postoperative complications, nipple sensation loss were associated more with periareolar incision (7/76 vs. 2/82, p=0.067) and (15/76 vs. 7/82, p=0.042) respectively whereas cosmetic assessment at six months demonstrated statistically better results in group A than in group B (62/76 vs. 50/82, p=0.004) (15)

In the last few decades of breast cancer surgery, organ conservation became highly significant in the case of early breast cancer which is proven to offer the same survival chance as mastectomy (6,7)

Vinay Rawlani et al (2011), Keith M. Blechman et al (2012) , Joohyun Woo et al (2020) and various other surgeons studied the incisions for nipple sparing mastectomy and breast conserving surgery in which they compared outcome from periareolar, lateral and inframammary incisions (13,14).

The periareolar incision was associated with higher incidence of nipple necrosis compared with lateral or inframammary incisions (38.1% versus 6.3%, P=0.028). They concluded that Inframammary incisions were superior to other two in respect to complications and NAC survival. Round block technique (12), retroglandular (11) batwing and cresent mastopexy can be used in large benign lesions,

Inframammary incision is used by plastic surgeons for breast augmentation and nowadays fibroadenoma excision. (4,5) This incision is concealed, does not affect nipple sensation, can be reused for subsequent breast surgeries, and they do not have breastfeeding complications after the surgery. The main drawback of the inframammary approach is that the scar may be visible in lying down.

In 1996, American plastic surgeon John Bostwick III proposed that the term "oncoplastic breast surgery" (OBS) encompass a wide variety of procedures requiring partial or complete immediate post-mastectomy restoration in addition to methods for avoiding the side effects of conservative treatment. (28) Advances in mastectomy techniques have made it possible to undergo an instantaneous breast reconstruction while maintaining oncological safety. (28)

Studies have shown that the cosmetic results after 10% volume loss from the inner quadrants and approximately 15-20% volume loss from the lateral quadrants was highly dissatisfactory. (8) In order to prevent the disadvantages of breast conserving study (BCS), a sophisticated organ conservation breast-surgery was developed with the adaptation of plastic surgery techniques in the last decade, which was named Oncoplastic Surgery (OPS) by Werner Audretsch. (9) These surgeries are based on the knowledge of breast anatomy - and aesthetic subunits (e.g. inframammary fold

(IMF), nipple and areola complex (NAC)) requiring plastic surgery knowledge. The OPS based on volume displacement by mobilizing the glandular pillars to fill the wound cavity and repositioning the NAC, after the radical removal of the tumor. According to each quadrant of the breast, various oncoplastic techniques can be applied, thus offering a personalized solution. The OPSs can be classified based on their technical complexity or on the level of volume (<20% / 20-50%) needed to be replaced (Level I./II.). (10). Following the OPS, the remaining scars caused by radiation become almost invisible, and due to the lack of wound cavity, adhesion does not occur. The most popular Level I. oncoplastic techniques are the periareolar or round-block techniques, or retro-glandular technique, for centrally located malignant tumors (cT< 3cm) and requires wide surgical excision less than 20% of the entire breast (11, 12)

Oncoplastic breast surgery are classically used in treatment of breast carcinoma and leads to superior cosmesis with oncologically safe excision. Tarekhashem et al (2017) conducted a retrospective observational study including 126 patients to compare Batwing versus in the surgical management of upper pole breast tumours which showed that batwing mammoplasty had a statistically significant higher rate of patient satisfaction (16)

However, their use in excision of benign breast lump is not studied yet. On literature search use of oncoplastic incisions in surgical excision of benign breast lump were very few mostly case reports and case series.

Prakasit Chirappapha et al (2015) evaluated the oncoplastic techniques for managing cases of giant benign phyllodes and found that for large phyllodes tumors, oncoplastic

surgery can prevent and correct breast deformities after adequate removal with wide margins, resulting in a good cosmetic outcome.(17)

Vercelli et al (2009), conducted a review of scar scales and scar measuring devices where they described attributes and deficiencies of each tool and scale and highlighted areas where further development is critical. Their conclusion was that an optimal, universal scar scoring system is needed in order to better characterize, understand and treat pathologic scarring. (5)

Selmy Awad et al (2021) conducted a multicentric observational study focused on the statistics of data collected from cases who underwent oncoplastic surgeries. The breast impact treatment scale assessment method was used to analyze the aesthetic outcomes, and they concluded that average scores were accepted in 90% of patients. (18) Quality of life and cosmesis were assessed by BREAST Q score in many studies. (19)

The crescent incision is used to optimize the position and appearance of the nipple—areola complex (NAC) by improving its symmetry, reducing NAC ptosis, and correcting nipple malposition by utilizing a shallow, intradermal, semicircular, or extended periareolar skin excision and closure. The improved breast geometry and new shape will help create a more satisfactory aesthetic result for the patient.

However the crescent oncoplastic incision has certain limitations also. The main limitation of the crescent mastopexy procedure is areola distortion, if the skin crescent width is too large. In most cases, this limit is 1 - 2cm in width.

Based on the above review of literature using the PubMed and Google Scholar databases, the excision of benign breast lumps by oncoplastic breast conserving techniques, is limited to case reports and case series. Whereas its prospective comparison with traditional lumpectomy could not be found.

The purpose of the current clinical study is to scientifically analyze and compare the aesthetic results of the standardized oncoplastic breast incisions for breast tumors prospectively with short term follow-up.

GAP IN EXISTING KNOWLEDGE

Benign conditions of often doesn't need excision but due to the anxiety of patient it usually requires removal (21). Cosmesis is of importance in breast surgery hence benign breast lump excision warrants cosmetically accepted incisions.

There have been studies which compared the classical overlying incision with periareolar incision and the inference drawn was that though periareolar is cosmetically better but can cause postoperative complications such as injury to lactiferous ducts, nipple areola complex necrosis, decreased sensation at nipple, increased rate of surgical site infection. Further it was found to be unsuitable for large and peripherally located lumps. Oncoplastic incisions are routinely used for malignant lumps and provide superior cosmesis. (22) These incisions are not routinely used in benign lump excision. (13) Review of literature revealed no such comparative studies for benign lump excision has been done till date. Studies has been done to compare periareolar, and lateral infra mammary incision in breast conserving, breast augmentation and nipple and skin sparing mastectomy (13). Hence we undertook this study to explore the outcome of oncoplastic incisions.

MATERIALS AND METHODS-

AIMS

1) To evaluate the role of oncoplastic incisions in large (>/+3 cm) benign breast lump excision
2) To evaluate the role of oncoplastic incisions in multiple (>1) benign breast lesion in a single breast

3) To study the surgical outcomes of oncoplastic incision on cosmesis, quality of life, postoperative complications and patient satisfaction

OBJECTIVES

Oncoplastic incisions have been used primarily for malignant breast lesions which provide superior cosmesis and good resection margins. These incisions are not yet routinely used for excision of benign breast lesion. To evaluate the surgical outcome of managing large and multiple benign breast lesions using oncoplastic incisions with respect to quality of life, cosmesis post operative complications and patient satisfaction and to propose the use of specific incision type for specific type of benign breast lump for a cosmetically better surgical outcome.

MATERIALS & METHOD

1. Study design: Prospective observational hospital-based study.
2. Study Setting: General Surgery Department, AIIMS Bhopal
3. Study time: April 2022 to Aug 2023 (18 months)
4. Study population: Patients attending OPD of Department of General Surgery, AIIMS Bhopal.

Inclusion criteria

a) All patients of diagnosed benign breast lesion of age 18 yr-60 yr who gave consent
b) All patients presenting with large (>/=3 cm) benign breast lesions planned for lumpectomy General surgery Department in AIIMS Bhopal
c) All patients presenting with multiple (>1 in single breast) benign breast lesions planned for lumpectomy General surgery Department in AIIMS Bhopal

Exclusion criteria

a) Benign breast lump with suspicion of malignancy after triple assessment.
b) Benign breast lump in patients with history of carcinoma.
c) Non palpable lesions
d) Patients with previous history of breast surgery or radiotherapy.
e) Patients who are non-co-operative or under psychiatric treatment.

f) Denial of consent

5. Total sample size- purposive sampling method (Total 74 patients divided into 2 groups with 37 patients in each group)

6. Methodology-

- After the patients met the inclusion criteria, they were divided into 2 groups as follows-
    1. Study group (group A): All patients of benign breast lesions undergoing lumpectomy by crescent oncoplastic incision.
    2. Control group (group B): Patients of benign breast lesions undergoing lumpectomy by conventional incisions (periareolar)

    In bilateral benign breast disease, each breast was taken as separate case.
- Details of demography, clinical examination, radiological investigation and pathological investigations of all participants was collected and recorded as per proforma.
- Preoperatively Age, body mass, height, BMI, pre - /postoperative cup sizes, presence of preoperative breast asymmetry, past history, medication, smoking habits, radiological and pathological data was recorded for all participants in both the groups.
- All participants filled the BREAST Q questionnaire preoperatively
- Group A- the benign breast lumps of patients in group A were excised as follows-
    1. Preoperative markings of outer and inner incision lines and an area in

between to be de-epithelised depending of the tumor size and location. was done before shifting the patient to Operating room.

2. An incision parallel to the areola is made in crescent shape and the area inside the marking is de-epithelised.
3. The incision is deepened along the outer edge of the crescent and lumpectomy was done.
4. The wound closure may be accomplished by approximating the superior and inferior dermoglandular edges in the retro-areolar fatty region to enable closure of the glandular tissue and skin
5. The subcutaneous tissue was approximated over the deepithelised dermis with polyglecaprone sutures (3-0) absorbable sutures
6. Skin was repaired using absorbable monofilament polyglecaprone sutures (3-0).

Image 1: Marking the incision site and the lumps

Image 2: De- epithelization of the crescent area.

Image 3: The incision is deepened from the outer edge of the crescent, dermoglandular flap is raised and the lumpectomy is performed.

Image 4: Closure of dermoglandular pillars and subcutaneous tissue

Image 5: Closure of skin

Group B- the patients of group B underwent excision of the lump by standard periareolar incision as depicted by picture.

Image 6: Periareolar incision

- After excision of lump histopathological examination (HPE) of excised specimen was recorded in both the groups.

Patients undergoing surgical excision of benign breast lump by either Crescent or Periareolar incision (Groups A and B) were evaluated and compared during early postoperative period (3rd postoperative day and 1 week after the surgery) late postoperative period (4 weeks and 12 weeks after the surgery) on the following parameters:

1. Post operative complications

   Patients were followed up postoperatively to obtain data regarding outcome associated with surgery and the incision by following-

   a) Clavien-Dindo Classification- Grade I complication (light inflammations, non-surgical hematoma or suffusion, seroma formation, partial skin/NAC loss, limited fat necrosis, SSI and lymphoedema) does not require medication or surgical treatment. Grade II complication is a Grade I complication that requires medication or surgical interaction (antibiotic therapy, re-suture due SSI and multiple puncture due chronic seroma). Grade III complication requires invasive surgical action (hematoma evacuation, chronic inflammation which requires reoperation, severe fat necrosis, full skin/ NAC necrosis and wound dehiscense). Grade IV complication means temporary organ

failure. Grade V complication is one that leads to death [ANNEXURE-4]

b) Pain- by visual analogue scale (VAS)-1/2/3/4/5/6/7/8/9/10 [ANNEXURE 5]

c) Discharge- by present / absent

(if present – type) serous (s)/ purulent (p)/ hemorrhagic (h))

d) Swelling- by present /absent

If present then type- hematoma/seroma/edema

2. Nipple sensation: Sensory assessment will be done for

a) touch (by cotton wick)

b) pressure (by needle cap)

c) pain (by needle prick)

They were scored for their presence or absent giving 1 and 0 respectively as score and a total between 0 to 3 were obtained where 3 was best and 0 was worst.

3. Assessment of cosmetic outcomes-

Was evaluated

a) Objective assessment-

i. Clinically by-

a) Measurements- The following measurements were taken in study participants of both the groups

i. Preoperative bust size

ii. Sternal notch-nipple distance

iii. Nipple-midline distance

iv. Circumference at the level of inframammary fold

b) The Vancouver scale- The Vancouver scar scale is a clinical tool to assess the cosmesis and properties of a scar. It contains 6 domains- vascularity, pigmentation, pliability, height, pain and itchiness where scores are given for each domains.

ii. Radiologically by- High resolution ultrasonography (HRSG) for scar thickness

b) Subjectively by- The Likert scale - The worldwide 5-point Likert scale is employed to evaluate opinions and attitudes. This is a five-point rating scale with two extreme poles and a neutral option connected to intermediate response alternatives. [ANNEXURE-2]

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

4. Patient satisfaction score –patient satisfaction is measured by BREAST-Q validated questionnaire. It was evaluated on

a. Quality of life domain- psychosocial and sexual wellbeing, physical wellbeing (chest and upper body.)
b. Satisfaction domains- satisfaction with breast, and nipple, satisfaction with outcome and care

According to this, we give a score in a 1-100 scale measuring the variables of "satisfaction with the breast", "discomfort by radiotherapy", "psychosexual wellbeing" and "physical wellbeing". We used a preoperative questionnaire and a postoperative questionnaire. Higher rates show better patient satisfaction. [14] The questionnaires are filled before the procedure and post operatively on 4,12 weeks and data recording of the BREAST-Q questionnaire and 5point Likert-scale [ANNEXURE-1]

5. Follow up was done at 3rd postoperative day, 1 week, 4 and 12 weeks after surgery to assess following:
   a) Pain by VAS Score
   b) Likert scale
   c) Vancouver scar scale
   d) HRSG of the scar (using 15 Mhz probe) (23)

- OUTCOME-
  a) Primary Outcome Measures
     1. Cosmetic results by scar evaluation [3days, 1, 4, 12 week follow up]

The Scar was evaluated by -

i. HRSG of the scar

ii. Vancouver Scar score. (24)

iii. Likert Scale. (25)-

The results were collected and averaged

2. Patients' satisfaction (BREAST Q questionnaire) [3days, 1 week, 4 weeks and 12 weeks]

b) Secondary Outcome Measures:

1. Complications after the surgery- as per Clavien -Dindo Classification (upto 12 weeks)

Statistical analysis

a) All data was collected using a standardized proforma.
b) Data was entered into standard database (MS EXCEL).
c) Data cleaning was done.
d) Dichotomous variables are described as proportion and frequency and continuous variables were presented as mean ± standard deviation.
e) Comparison was made between post-operative variables of different incisions used for surgery.
f) Inter group comparison of categorical variables was done using Chi-square test and statistical significance of inter-group

difference of means of continuous variables were tested using unpaired t test.

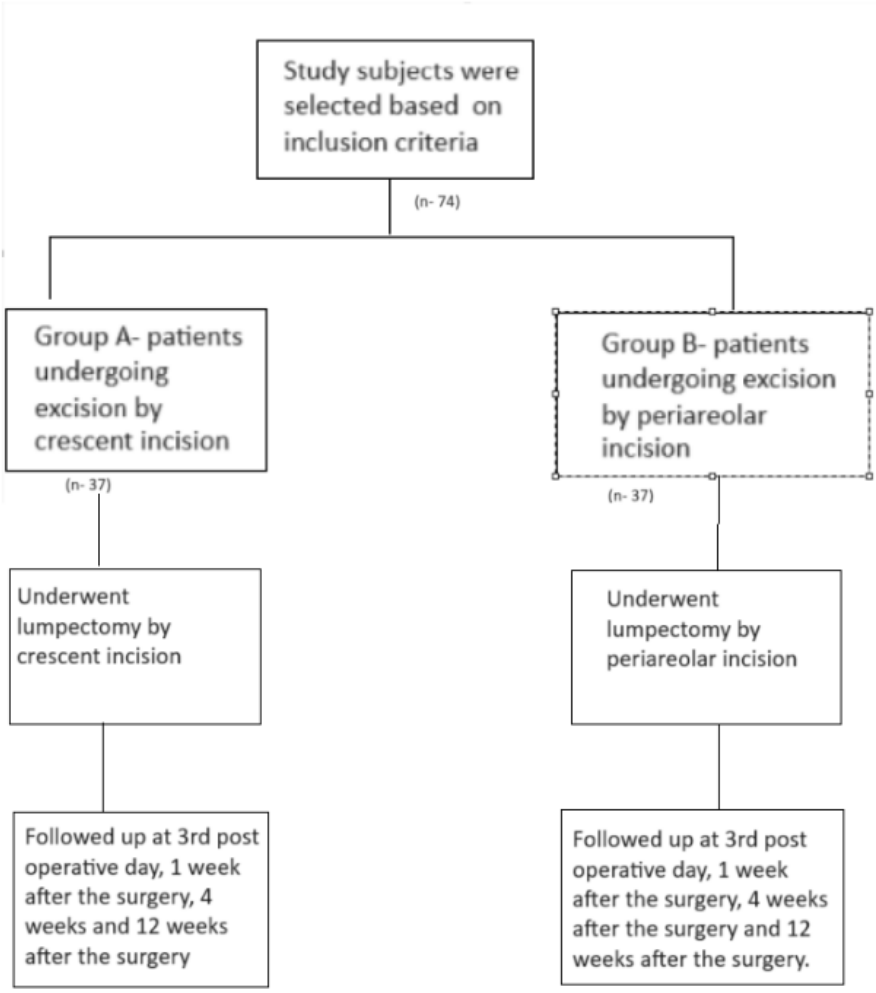
g) A p-value of 0.01 to 0.05 was considered statistically significant.

h) Data collected was analyzed using SPSS (Statistical Package for the Social Sciences).

i) We expect that persons undergoing lump excision by oncoplasty incision would have better cosmetic as well as better outcome regarding post-operative complication

j) As per the review of literature studies for direct comparison of the two types of incisions are not there, so the sampling method will be convenient sampling, according to which we will consider every patient who will undergo benign breast lump excision at AIIMS, Bhopal as study participant.

CONSORT DIAGRAM OF OUR STUDY


Study subjects were selected based on inclusion criteria
(n- 74)
Group A- patients undergoing excision by crescent incision
(n- 37)
Group B- patients undergoing excision by periareolar incision
(n- 37)
Underwent lumpectomy by crescent incision
Underwent lumpectomy by periareolar incision
Followed up at 3rd post operative day, 1 week after the surgery, 4 weeks and 12 weeks after the surgery
Followed up at 3rd post operative day, 1 week after the surgery, 4 weeks after the surgery and 12 weeks after the surgery.

Evaluation of outcomes after surgery-

1. Post operative complications
2. Cosmetic evaluation
3. Patient satisfaction

OBSERVATION AND RESULTS

In this study 'A prospective evaluation of the role of oncoplastic incisions for benign breast lesions excision' we compared crescent oncoplastic incision with periareolar incision in benign breast lesion excision performed at the General Surgery department of AIIMS Bhopal from April 2022 to August 2023. A total of 74 patients who underwent excision of benign breast lesions were divided into 2 groups- one which underwent excision by crescent incision and another by the periareolar incision.

Demography-

The basic demographic parameters were comparable between the 2 groups as depicted in table no 1 with mean age of patients in crescent group being 27.14±8.64 years and in the periareolar group being 34.49±11.99 years (**p value 0.01**)

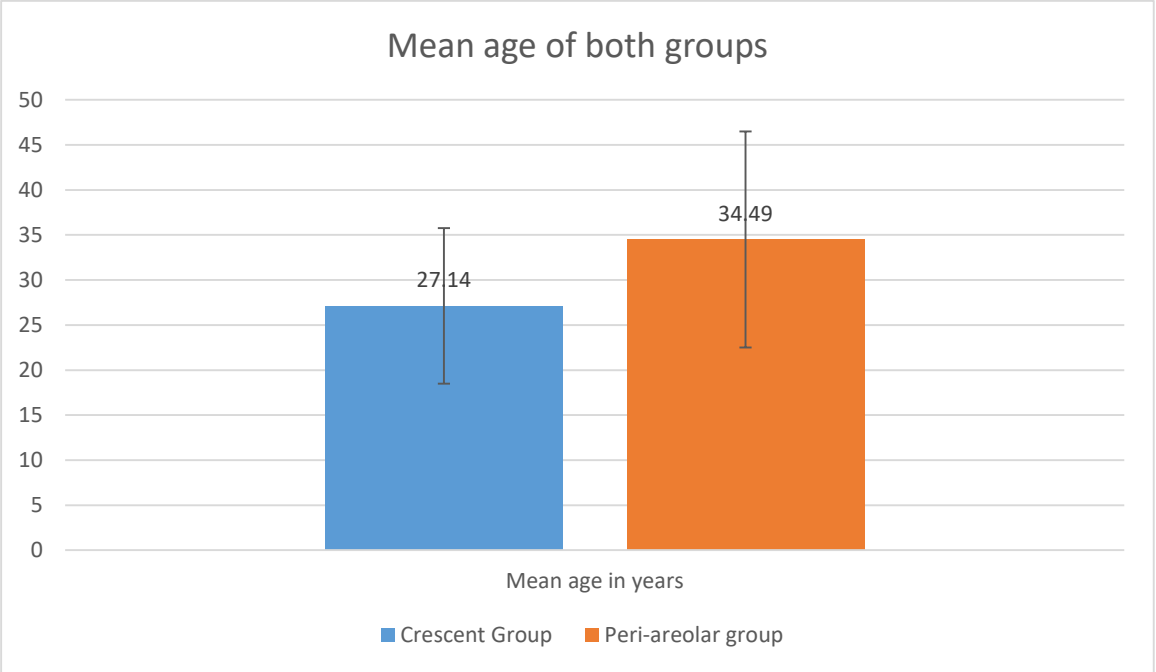
In the crescent group 3 patients (8.1%) were males and 34 patients (91.9%) were females. In the periareolar group all the patients were females.

The findings are depicted in table no 1 and graph no 1.

Table 1: Comparison of baseline characteristics between both groups

	Crescent Group	**Peri-areolar group**	**p value**
Age in years	27.14±8.64	34.49±11.99	**0.01**
Gender			
Male	3 (8.1%)	0	0.24
Female	34 (91.9%)	37 (100%)	
Distance from NAC	3.20±0.71	2.37±0.82	**<0.001**

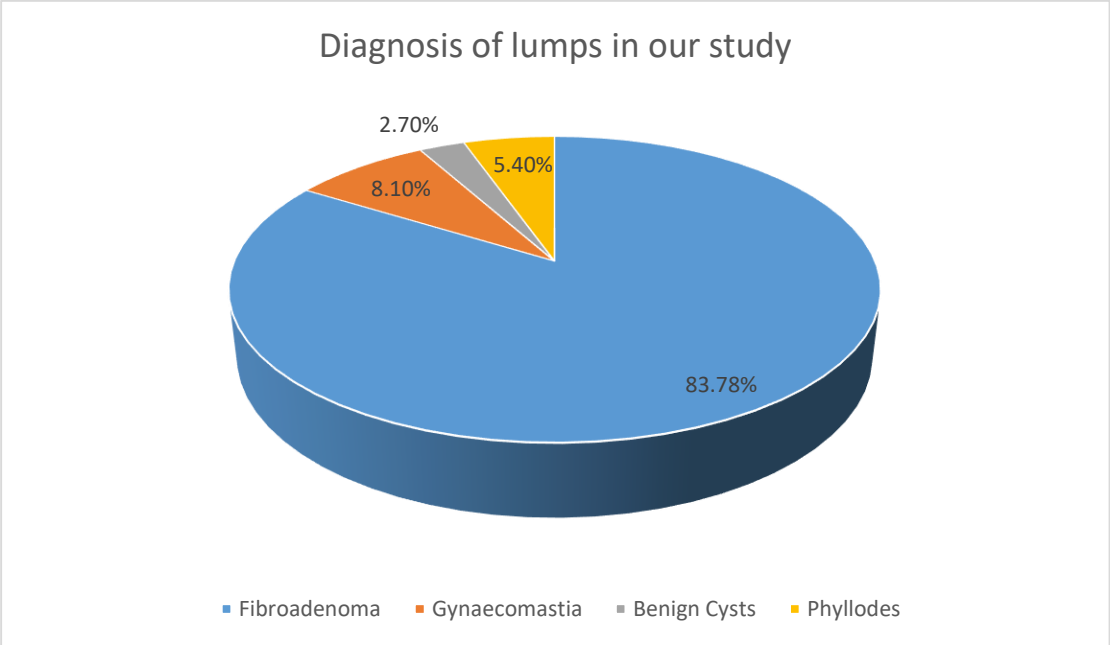
Graph 1: Mean age in the study population



Diagnosis- Out of the total 74 patients in our study, 37 patients underwent lumpectomy by crescent incision and 37 patients underwent lumpectomy by periareolar incision. Out of the 37 patients in the crescent incision group 31 patients had fibroadenoma (83.78%), 3 patients had bilateral gynaecomastia (8.1%), 1 patient had benign breast cyst (2.7%) and 2 patient had benign phylloides tumour (5.4%) proven histopathologically. Out of the 37 patients who underwent excision by periareolar incision, all patients had fibroadenomas, proven histopathologically. Incidence of large fibroadenomas (>/=3 cm) was found to be 40 % in our study.

The same has been depicted in the following chart no 1.

Chart no 1- Diagnosis of lumps in our study (proven histopathologically)



Distance of the lump from NAC- In the crescent group the mean distance of the lump from NAC is 3.20±0.71 cm and the mean distance of lump from NAC in periareolar group was 2.37±0.82 cm. The p value between the 2 groups was **<0.001**. Crescent incision was able to access lumps located at farther distances as compared to periareolar incision.

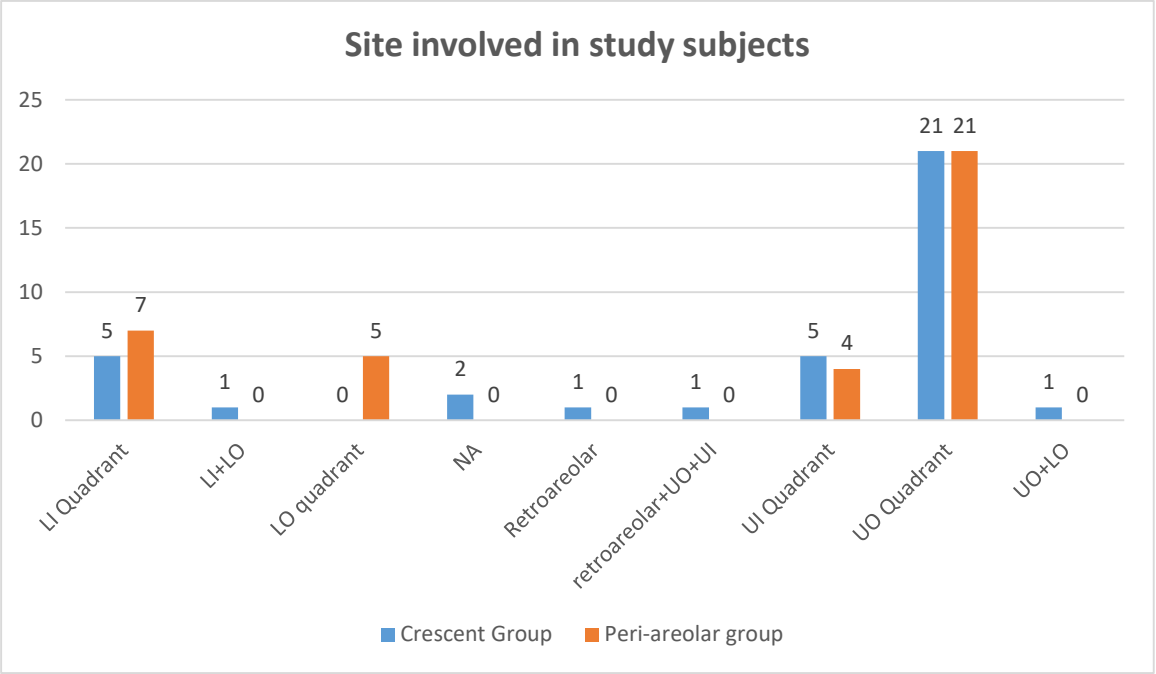
Site of the lump- the breast was divided into 4 quadrants- upper outer quadrant, upper inner quadrant, lower outer quadrant, lower inner quadrant. The lumps were classified into the quadrants in which they were predominantly present. A lump which extended from one quadrant to another were expressed as a combination of quadrants. Most common quadrant in which the lumps were present was upper outer quadrant in both

periareolar and crescent group (21 in each). The same has been depicted in table no 2 and graph no 2.

Table 2: Site involved in study subjects

	Crescent Group	**Peri-areolar group**
LI Quadrant	5	7
LI+LO	1	0
LO quadrant	0	5
NA	2	0
Retroareolar	1	0
retroareolar+UO+UI	1	0
UI Quadrant	5	4
UO Quadrant	21	21
UO+LO	1	0

Graph 2: Site of the lump in study subjects



Comparison of different distances between both groups –

Bust size- the average bust size in the crescent group was 41.49±6.71cm. The average bust size in the periareolar group was 41.46±5.51cm. p value was 0.98

Midline to nipple distance -

Right side- The mean pre operative midline to nipple distance on right side in crescent incision group was 20.50±3.94 cm. The mean post operative midline to nipple distance on right side was 19.83±4.13 cm. The p value was **<0.001**.

In periareolar group on right side, the mean pre operative midline to nipple distance was 20.81±2.46 cm and the mean post operative distance was 20.45±2.44 cm. The p value was <**0.001**.

Left side- On left side the mean pre operative midline to nipple distance in crescent incision group was 20.43±4.48 cm. The mean post operative midline to nipple distance on left side in crescent incision group was 19.87±4.15. The p value was <**0.001**

In the periareolar group the mean pre operative midline to nipple distance on left side was 20.79±2.59 cm. The mean post operative midline to nipple distance was 20.43±2.45 cm. The p value was <**0.01.**

Sternal notch to nipple distance-

Right side- The mean pre operative sternal notch to nipple distance on right side in crescent incision group was 23.62±2.86 cm. The mean post operative midline to nipple distance on right side was 23.02±3.06 cm. The p value was <**0.001**.

In periareolar group on right side, the mean pre operative sternal notch to nipple distance was 24.59±1.72 cm and the mean post operative distance was 24.31±1.54 cm. The p value was <**0.01**.

Left side- On left side the mean pre operative sternal notch to nipple distance in crescent incision group was 23.52±3.37 cm. The mean post operative midline to nipple distance on left side in crescent incision group was 23.08±3.12 cm. The p value was <**0.001**

In the periareolar group the mean pre operative sternal notch to nipple distance on left side was 24.59±1.72 cm. The mean post operative midline to nipple distance was 24.24±1.60 cm. The p value was **<0.01.**

There was no change in the mean infra mammary fold measurements in the pre operative and post operative period. With p value of 1.

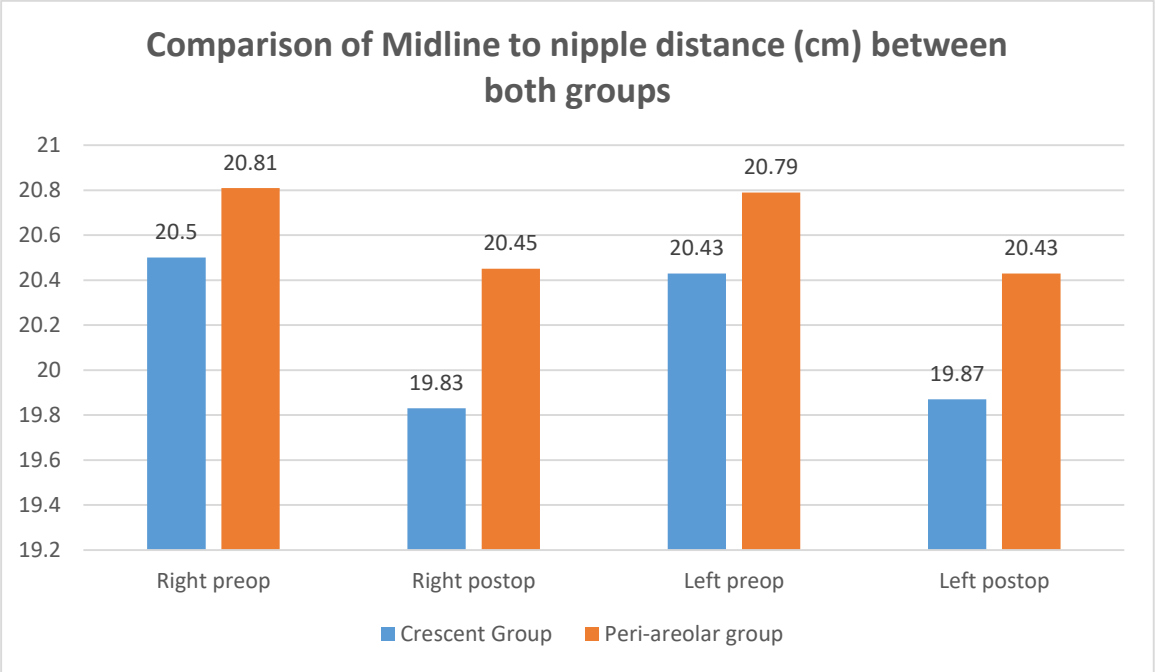
The findings are depicted in table no 3 and graph no 3 and 4.

Table 3: Comparison of different distances between both groups

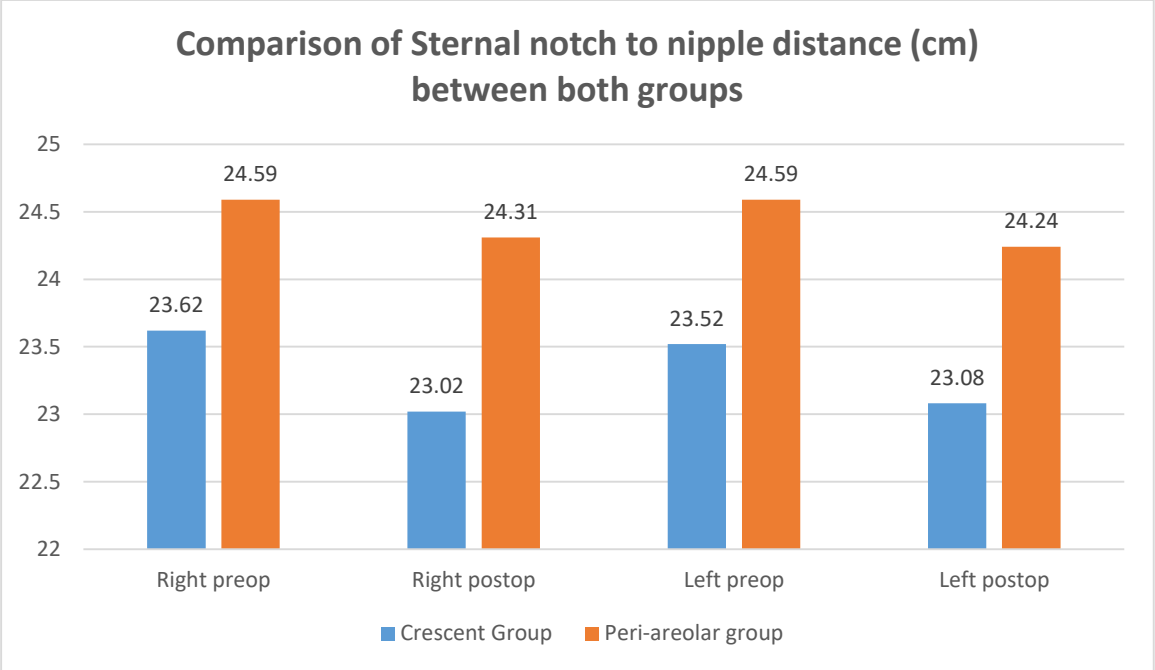
	Crescent Group	**Peri-areolar group**	**p value**
Bust size (cm)	41.49±6.71	41.46±5.51	0.98
Midline to nipple distance (cm)			
Right preop	20.50±3.94	20.81±2.46	0.68
Right postop	19.83±4.13	20.45±2.44	0.43
Intragroup p value (b/w pre and post)	**<0.001**	**<0.001**	
Left preop	20.43±4.48	20.79±2.59	0.67
Left postop	19.87±4.15	20.43±2.45	0.48
Intragroup p value (b/w pre and post)	**<0.001**	**<0.01**	
Sternal notch to nipple distance (cm)			
Right preop	23.62±2.86	24.59±1.72	0.08
Right postop	23.02±3.06	24.31±1.54	**0.02**

Intragroup p value (b/w pre and post) (cm)	**<0.001**	**<0.01**	
Left preop	23.52±3.37	24.59±1.72	0.09
Left postop	23.08±3.12	24.24±1.60	**0.04**
Intragroup p value (b/w pre and post) (cm)	**<0.001**	**<0.01**	
Inflammatory fold(cm)			
Preop	32.87±5.03	34.24±5.06	0.24
Postop	32.87±5.03	34.24±5.06	0.24
Intragroup p value (b/w pre and post) (cm)	1.0	1.0	

Graph 3: Midline to the nipple distance in both the groups



Graph 4: Sternal notch to nipple distance



Comparison of postoperative complications-

1. Comparison of pain by VAS score- pain was assessed by visual analogue score at 3rd post operative day, 1 weeks, 4 weeks and 12 weeks post operatively. The pain scores were compared between the periareolar and the crescent group. The mean VAS score at post operative day 3 was 3.46±1.44 in the crescent group as compared to 3.43±1.50 in the periareolar group. The p value was 0.94. the mean VAS score at 1 week was 1.08±1.18 in the crescent group as compared to 0.51±0.73 in the

periareolar group. The p value was **0.03.** the VAS score at 4 weeks and 12 weeks were similar in both groups with no significant differences.

2. Comparison of postoperative discharge- discharge from the post operative site was compared between the crescent and the periareolar group at 3rd post operative day, 1 week, 4 week and 12 weeks post operatively. Discharge was seen in 1/37 patient and in 3/37 patient in the periareolar group. P value was 0.61. there was no significant differences in discharge between the groups.
3. Comparison of postoperative swelling- there was no swelling observed in the postoperative period in any patients who underwent surgery by both crescent incision and periareolar incision group.
4. Comparison of nipple sensations- the nipple sensations were present in all the patients who underwent surgery by crescent incision. Nipple sensations were present in 36/37 patients in the periareolar group. The p value was 1.

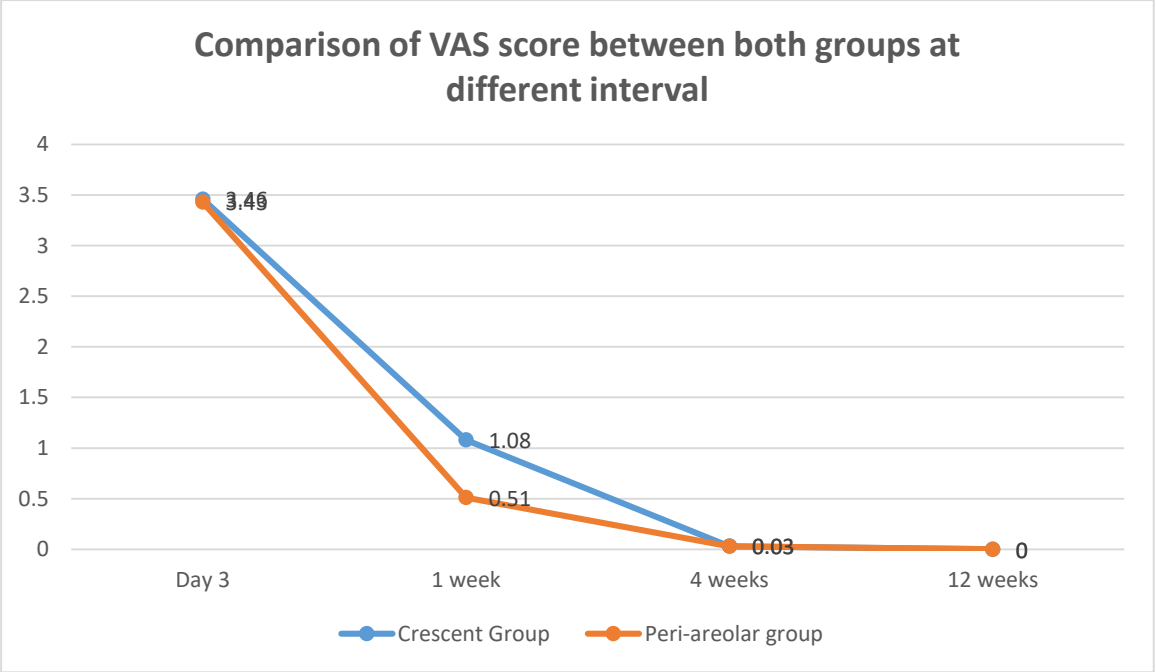
The same has been depicted in table no 4 and graph no 5.

Table 4 : Comparison of postop complications between both groups at different interval

	Crescent Group	**Peri-areolar group**	**p value**
VAS score			
Day 3	3.46±1.44	3.43±1.50	0.94
1 week	1.08±1.18	0.51±0.73	**0.03**

4 weeks	0.03±0.16	0.03±0.16	1.0
12 weeks	0±0	0±0	1.0
Discharge			
Day 3	1 (2.7%)	3 (8.1%)	0.61
1 week	0	0	-
4 weeks	0	0	-
12 weeks	0	0	-
Swelling			
Day 3	0	0	1.0
1 week	0	0	1.0
4 weeks	0	0	1.0
12 weeks	0	0	1.0
Nipple sensations +nt			
Day 3	37 (100%)	36 (97.3%)	1.0
1 week	37 (100%)	36 (97.3%)	1.0
4 weeks	37 (100%)	36 (97.3%)	1.0
12 weeks	37 (100%)	36 (97.3%)	1.0

Graph 5: VAS score between the two groups



Comparision of Clavien- Dindo classification between both the groups- post operative complications were classified according to Clavien Dindo Classification and were compared between the crescent and periareolar group at 3rd post operative day, at 1 week, 4 weeks and 12 weeks post operatively.

At 3rd post operative day- no complications were seen in 36 (97.3%) patients in crescent group and in 32 (86.5%) patients. Grade II complications were seen in 1 (2.7%) patient and in 3 (8.1%) patient. Grade IIIA complications were seen in 2 patients (5.4%) in the periareolar group and in none of the patients in the crescent incision group. The p value between the 2 groups was 0.19.

At 1 week- no complications were seen in 34 (91.9%) patients in the crescent group and 33 (89.2%) in the periareolar group. Grade II complications were seen 2 (5.4%) patients in the crescent group and 2 (5.4%) in the peri areolar group. Grade IIIA complications

were seen in 1 (2.7%) patient in the crescent group and 2 (5.4%) patients in the periareolar group. The p value between the 2 groups was 0.84.

At 4 weeks- no complications were seen in 35 (94.6%) patients in both the groups whereas grade II complications were seen in 2 (5.4%) patients of the periareolar group and none of the patients of the crescent incision group. The p value between the two groups was 0.49.

At 12 weeks- all the patients in both the groups were complication free. (p=1)

The findings are depicted in table no 5.

Table 5 : Comparison of Clavein dindo classification between both groups at different interval

Clavein dindo classification	**Crescent Group**	**Peri-areolar group**	**p value**
Day 3			
Nil	36 (97.3%)	32 (86.5%)	0.19
Grade II	1 (2.7%)	3 (8.1%)	
Grade IIIA	0	2 (5.4%)	
1 week			
Nil	34 (91.9%)	33 (89.2%)	0.84
Grade II	2 (5.4%)	2 (5.4%)	
Grade IIIA	1 (2.7%)	2 (5.4%)	
4 weeks			
Nil	35 (94.6%)	35 (94.6%)	0.49
Grade II	0	2 (5.4%)	

12 weeks			
Nil	37 (100%)	37 (100%)	1.0

Comparison of post operative scar in both the groups- the scars in both the groups were compared objectively using Vancouver scar scale and measurement of scar thickness by HRSG of the scar, and subjectively using Likert scale.

Vancouver scar scale- the mean score in the Crescent group was 4.24±1.93 and in the periareolar group it was 6.62±1.72. the p value was **<0.001.**

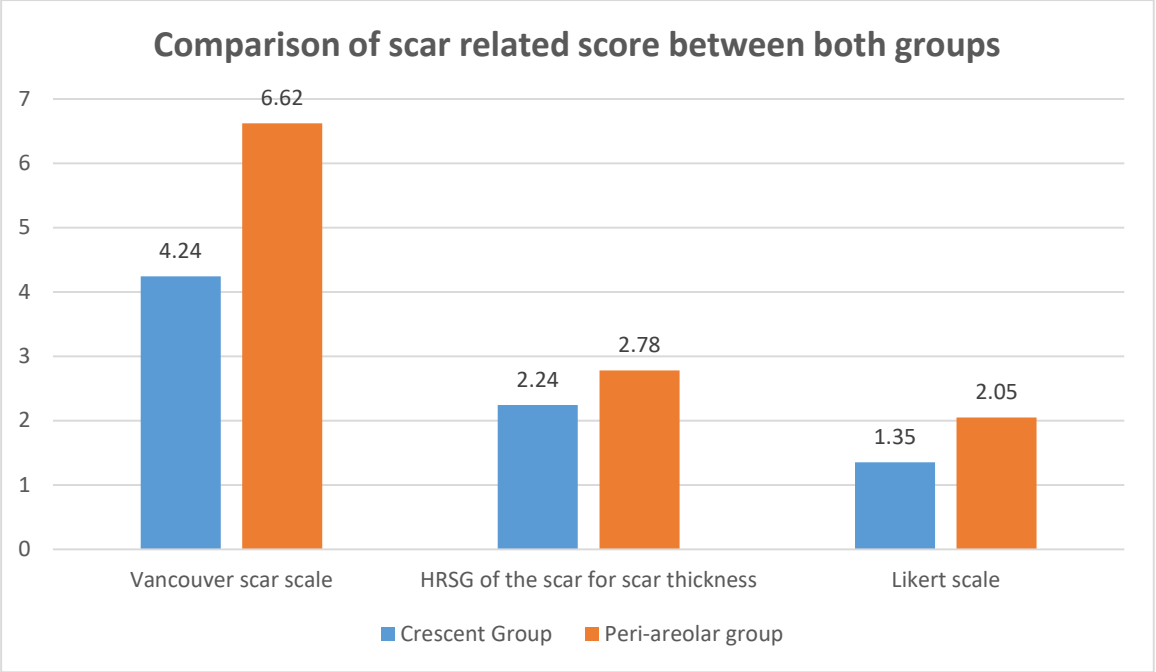
HRSG for scar thickness- HRSG of the scar was done to measure the scar thickness. The mean scar thikness in the crescent group was 2.24±0.64mm and in periareolar group, it was 2.78±1.18mm. the p value was **0.02.**

Likert scale- the mean score in the crescent group was 1.35±0.48 and in periareolar group it was 2.05±1.26. the p value was **<0.01.** the same has been depicted in table no 6 and graph no 6.

Table 6 : Comparison of scar related score between both groups

	Crescent Group	**Peri-areolar group**	**p value**
Vancouver scar scale	4.24±1.93	6.62±1.72	**<0.001**
HRSG of the scar for scar thickness	2.24±0.64	2.78±1.18	**0.02**
Likert scale	1.35±0.48	2.05±1.26	**<0.01**

Graph 6 : Comparison of scars between the two groups



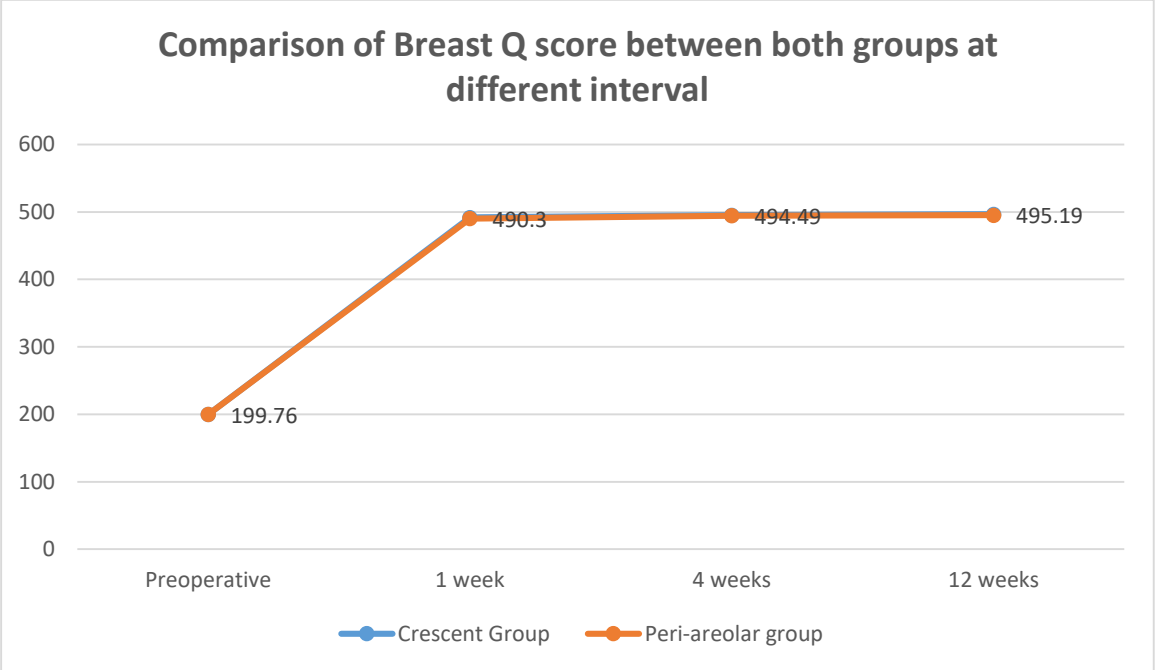
Comparison of patient reported satisfaction score (BREAST Q)- The BREAST Q scores between the two groups were compared at pre operative period, at 1 week post-surgery, at 4 weeks and at 12 weeks after the surgery. However no significant differences were found between the two groups.

The same has been depicted in table no 7 and graph no 7.

Table 7: Comparison of Breast Q score between both groups at different interval

	Crescent Group	Peri-areolar group	p value
Preoperative	199.89±3.08	199.76±3.10	0.85
1 week	492.0±9.14	490.3±10.97	0.47
4 weeks	495.22±6.68	494.49±8.33	0.67
12 weeks	496.57±7.01	495.19±9.78	0.48

Graph 7: Comparison of BREAST Q scores between the two groups



DISCUSSION

Benign breast lumps are one of the most common pathologies encountered by a surgeon, fibroadenomas being the most common one. Upto 50 % of all clinically palpable benign breast lumps are fibroadenomas (3). In our study we compared the outcomes of large benign breast lesion (>/= 3cm) excision by two incisions- the periareolar incision and the crescent incision**.**

There are various management modalities for fibroadenoma at present which ranges from observation and follow up to minimal invasive techniques till surgical excision. No evidence based guidelines (RCT) are available for management of breast fibroadenoma. Surgical excision is one of the commonest management modalities and very commonly performed. In the literature, the most commonly reported approaches used for excision are, periareolar and inframammary (Gaillard-Thomas) approaches. (36, 37)

One of the most common breast surgeries is excision of fibroadenoma, still the optimal surgical technique is not available for the same. Historically fibroadenoma were excised using an overlying incision which was replaced by periareolar incision after studies reported cosmetic advantages and feasibility of periareolar incision (10,12,13,16).

The major advantage of periareolar incision is that it is a simple, prudently planned, cosmetically acceptable incision which provides adequate access and exposure. The position of the lesion does not limit the applicability of this technique as the incision can be placed anywhere along the circumference of the areola. In periareolar incision there is a potential for injury to the ductal system leading to compromised lactation in future, necrosis of the nipple areola complex, altered nipple sensitivity (1). Though advantageous cosmetically as was found in studies, Periareolar incision can lead to

significant complications which can be NAC necrosis, sensory loss of NAC, distortion of NAC, Lactational failure and disorders secondary to damage to NAC in later life (10,12,13,16).

Studies were done to find other modalities for fibroadenoma removal via non-surgical means, but found to be more costly and require complex health setup which is not always possible at developing countries like ours (4-6).

In comparison to conventional methods, oncoplastic breast surgery techniques have identified effective treatments of benign lesions, particularly the big and multiple ones (32). The quickly expanding field of oncoplastic breast surgery aims to enhance the physician commitment to restore the patient's image and self-assurance. By combining a multidisciplinary approach to diagnosis and treatment with oncoplastic surgery, successful results in the eyes of the patient and physician are significantly more likely to occur.

No studies are done till date comparing the outcomes of periareolar and crescent approaches of benign breast lumps excision.

In our study a total of 74 patients participated, all of whom were having benign breast lumps, proven histopathologically. Patients were divided into 2 groups, group A who underwent excision by periareolar incision and group B who underwent excision by crescent incision and the outcomes were compared in terms of scar outcomes, patient’s satisfaction and quality of life.

The most common pathology encountered, in our study was large fibroadenoma, the prevalence of which was 83.78%, followed by gynaecomastia (8.10%) and benign phyllodes tumor (5.40%) and benign cyst (2.70 %). The prevalence of these benign pathologies was found to be similar as compared to studies conducted by other authors.

(32) Similar findings were noted by Bagale et al, Mallik arjuna et al, Prajapati et al and Pudale et al. (33, 34, 35). The prevalence of benign pathologies in females in our study was found out to be 94.94% and in males, it was 4.05%. Similar findings are reported by studies conducted by Hatim et al. (32)

The mean distance from the NAC was significantly more in the patients who underwent excision by crescent incision (3.20±0.71 cm) as compared to patients who underwent excision by peri-areolar incision (2.37±0.82 cm) proving that crescent incision provided access to more peripherally located lumps. In our study most of the lumps were located in the Upper Outer Quadrant (21 out of 37 patients in both the groups: 56.75 %). There were significant differences in the preoperative and postoperative measurement (midline to nipple distance, sternal notch to nipple difference). In a study conducted by Joseph Lin et al, the authors found out that the oncoplastic crescent incision could help in removing large tumors without compromising breast appearance. (41)

Most of the studies conducted previously used crescent oncoplasty incision for lumps located in upper quadrants of the breast, (43) however in our study we used crescent incision for lumps located in all the quadrants of the breast and achieved favourable results in terms of cosmesis of the breast and patient satisfaction.

In our study there was 2 patient who had benign phylloides tumour of the breast who underwent excision by crescent incision with excellent cosmetic outcomes and no recurrence. For phyllodes tumour excision, round block and batwing incisions have been used as per the literature, however crescent incision has not been used previously.

Post operative complications like pain, discharge, swelling, loss of nipple sensations were compared between the two groups at postoperative day 3, 1 week after the surgery, 4 weeks after the surgery, and 12 weeks after the surgery. Significant differences were

found in the post operative pain at 1 week after the surgery where the patients of periareolar incision group experienced less pain as compared to the crescent incision group. No studies are available in the literature for comparison of post operative complications in crescent with periareolar incision.

Post operative scar formation was also compared between the 2 groups with the help of Vancouver scar scale, HRSG done for scar thickness and Likert scale and it was found out that the patients who underwent excision by crescent incision experienced less scarring. A study conducted by Dennis eta al concluded that periareolar incision results in favorable scar. (42) However no studies are available comparing the scars of periareolar and crescent incision.

Patient satisfaction after the surgery was compared between the 2 groups with the help of Breast Q score. However no significant changes were found between the 2 groups.

A good cosmetic outcome from breast surgery is associated with better psychosocial adjustment after treatment. This is very important for young females who undergo surgery

Limitations of the study-

1) The sample size was limited as large benign lesions are less frequent.

2) NAC size was not taken into consideration for assessing symmetry as very wide range of variation was observed. Further studies should be done in which NAC size should be taken into consideration for proper objective evaluation of the crescent incision.

3) Various studies have used crescent incision for lumpectomy for breast lump situated in the upper half of the breast. In our study we found good post operative cosmetic outcomes in lumps situated in all quadrants of breast as lower quadrant lumps were near the NAC. So further RCTs are required for using crescent incision for lumpectomy in benign breast lesions situated in the lower quadrant.

4) This study is not a randomised control study. Further studies of good quality randomised control trial should be done for level 1a evidence to prove the better cosmesis of crescent incision.

CONCLUSION

- The standard of care for selected cases should be the use of oncoplastic surgery to treat large benign breast lumps, which is a recent revolution in surgical case management.
- Benign breast lumps can be successfully treated using crescent oncoplastic incision, with good cosmetic results. It prevents breast deformity and its detrimental psychological repercussions while enabling safe wide resections, tolerable scars, and other benefits like patient satisfaction. When possible, we recommend using oncoplastic incisions like crescent incision in situations with large and numerous benign lumps.
- The location of the tumor, the size of the breast, and the distance of the tumor from the nipple areola complex are the primary factors in the selection of the oncoplastic approach. As a result, each case should receive a thorough evaluation before a decision is made.

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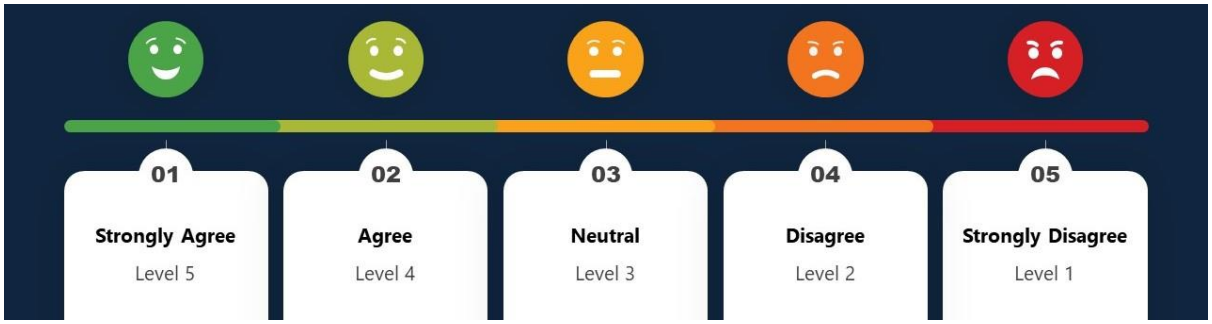
ANNEXURE 1

BREAST Q QUESTIONNAIRE

Domain
Satisfaction with breast
Psychological well-being
Physical well-being
Sexual well-being
Satisfaction with information
Satisfaction with surgeon
Satisfaction with medical staff
Satisfaction with office staff

ANNEXURE 2

5 POINT LIKERT SCALE



ANNEXURE 3

VANCOUVER SCAR SCALE

	Feature	Score
Vascularity	Normal	0
	Pink	1
	Red	2
	Purple	3
Pigmentation	Normal	0
	Hypo-pigmentation	1
	Mixed-pigmentation	2
	Hyper-pigmentation	3
Pliability (Elasticity)	Normal	0
	Supple (flexible with minimal resistance)	1
	Yielding (giving way to pressure)	2
	Firm (inflexible, not easily moved, resistant to manual pressure)	3
	Banding (rope-like tissue that blanches with extension of the scar)	4
	Contracture (permanent shortening of scar, producing deformity or distortion)	5
Height	Flat	0
	< 2 mm	1
	2-5 mm	2
	> 5 mm	3
Pain	None	0
	Occasional	1
	Requires medication	2
Itchiness	None	0
	Occasional	1
	Requires medication	2

ANNEXURE 4

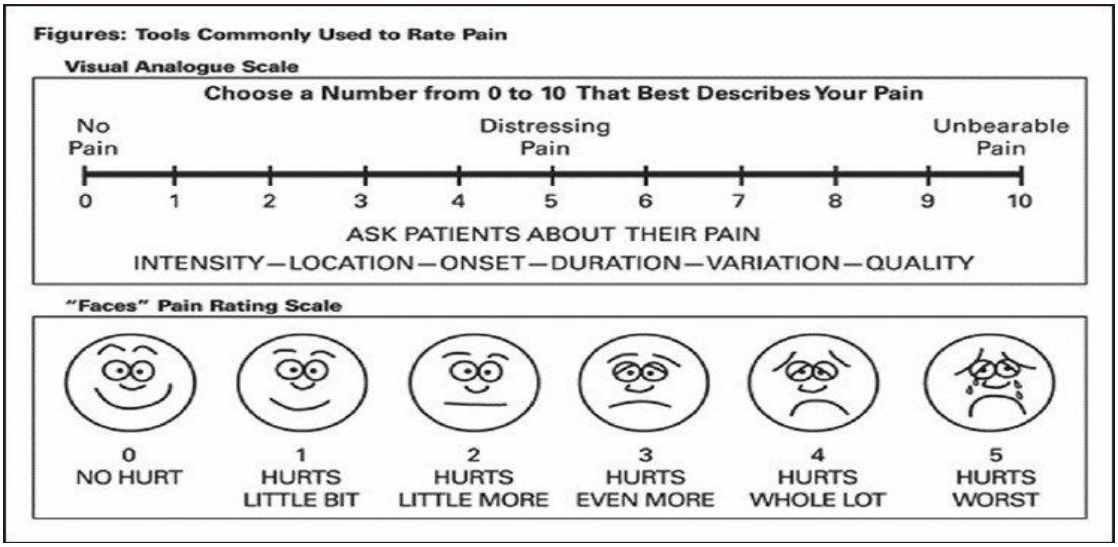
CLAVEIN DINDO CLASSIFICATION

Grade	Definition
Grade I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgetics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside.
Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications
Grade III	Requiring surgical, endoscopic or radiological intervention
Grade IIIa	Intervention not under general anesthesia
Grade IIIb	Intervention under general anesthesia
Grade IV	Life-threatening complication (including CNS complications)* requiring IC/ICU management
Grade IVa	Single organ dysfunction (including dialysis)
Grade IVb	Multi organ dysfunction
Grade V	Death of a patient
Suffix "d"	If the patient suffers from a complication at the time of discharge, the suffix "d" (for disability) is added to the respective grade of complication. This label indicates the need for a follow-up to fully evaluate the complication.

*Brain hemorrhage, ischemic stroke, subarrachnoidal bleeding, but excluding transient ischemic attacks, *CNS* central nervous system, *IC* intermediate care, *ICU* intensive care unit

ANNEXURE 5

VISUAL ANALOGUE SCALE FOR POST OPERATIVE PAIN


Figures: Tools Commonly Used to Rate Pain
Visual Analogue Scale
Choose a Number from 0 to 10 That Best Describes Your Pain
No Pain
Distressing Pain
Unbearable Pain
0 1 2 3 4 5 6 7 8 9 10
ASK PATIENTS ABOUT THEIR PAIN
INTENSITY—LOCATION—ONSET—DURATION—VARIATION—QUALITY
"Faces" Pain Rating Scale
0 NO HURT
1 HURTS LITTLE BIT
2 HURTS LITTLE MORE
3 HURTS EVEN MORE
4 HURTS WHOLE LOT
5 HURTS WORST

ANNEXURE 6

PATIENT PROFORMA

Name of the patient: Age/Sex:

UHID: Contact no.:

Residence: urban/rural

Height/ weight:

Disease characteristic

A.) Symptoms:

1) Pain: Y/N Rt/Lt/Both Duration: Cyclic/Noncyclic

2) Lump: Y/N Rt/Lt/Both Duration:

3) Nipple discharge: Y/N Rt/Lt/Both

a) Duration:

b) Single/Multiple duct:

c) position:___o'clock

d) Spontaneous/On pressure:

e) Colour- Serous/Green/Black/Bloody/Purulent

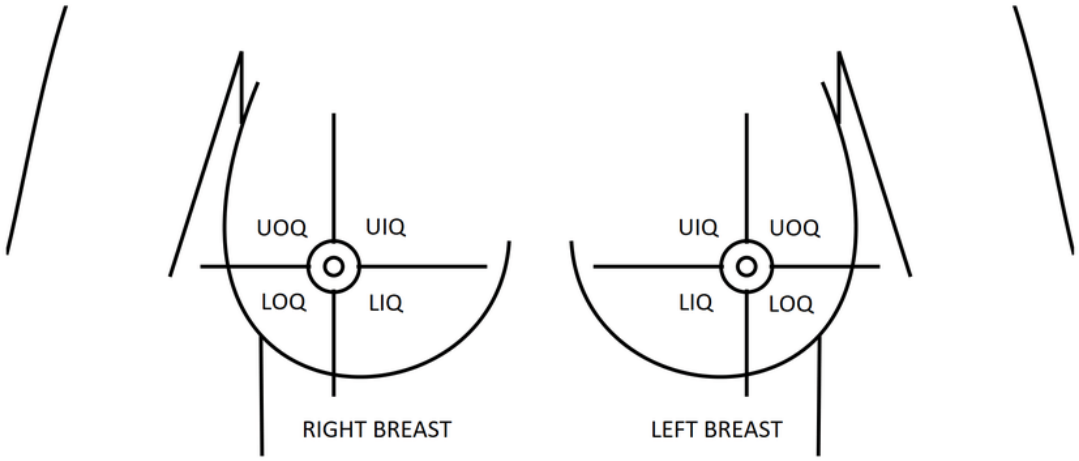
4) Retraction of nipple: Y/N Rt/Lt/ Both:

a) Duration:

5)Others-

a) Menstrual history: Regular/Irregular/Post menstrual
b) Marital status- married/ unmarried
c) Obstetric history:
d) Lactation: Y/N if no why
e) Hormonal intake: yes/No if yes-drug/Duration/dose
f) Co morbid conditions-DM/HT/Thyroid dysfunction /PCOD/
g) Previous surgical history: present/absent
h) Family history of breast or ovarian cancer: Y/N.
i) Addiction history

B) Examination: (show in diagram)



1)Breast cup size: A/B/C/D

2)Discrete lump/ Nodularity

A. Size(in cm):

B. Distance from NAC:

C. Site: UOQ/LOQ/UIQ/LIQ/Central

D. Mobility-Y/N. If present-skin/Surrounding tissue/muscle

E. Consistency- soft/ firm/ hard

F. Surface- regular/ irregular

G. Margins- well defined/ ill defined

H. Tenderness: Y/N

I. Axillary nodes palpable: Y/N

3) NAC-Normal/abnormal (inverted/ retracted/ deviated)

4)) Nipple sensation:

Sensory assessment will be done for

A. touch (by cotton wick) - 0/1

B. pressure (by needle cap)- 0/1

C. pain (by needle prick) – 0/1

C] Sonomammography findings:

1. BIRADS –
2. Impression-

D] Pathological findings

1. FNAC:
2. Trucut:

.

3 Post Operative HPE report:

E] Diagnosis

F] Treatment-surgical

1. Planned procedure
2. Planned incision: oncoplasty (Group A) /conventional (Group B)
3. Procedure done: Date:
4. Incision:
5. Length:
6. Skin closure:
7. Suture used:
8. Tumour size(mm)
9. Weight of the excised specimen(gm)

G] Early Follow up (On day 3, 7)

i. Pain- VAS Score -0/1/2/3/4/5/6/7/8/9/10
ii. Discharge from wound- present / absent

    (if present) type- serous / purulent / hemorrhagic
iii. Swelling- present/ absent

    If present- hematoma/ seroma/ edema

H] Late Follow up (30 and at 90 days)

i. Scar

a) Vancouver scar scale-

i. Vascularity- 0/1/2/3

ii. Pigmentation- 0/1/2/3

iii. Pliability- 0/1/2/3/4/5

iv. Height- 0/1/2/3

v. pain-0/1/2

vi. itchiness- 0/1/2

ii. b) Cosmesis

Breast Q score

iii. c) HRSG of the scar